THE WESTERN NATURALIST

Volume One December 1972

CONTENTS

Foreward - Rt. Hon. Viscount Muirshiel, C.H., C.M.G. 1

Editorial 2

The Wild Goats of the Clyde Area
Dr. J.A. Gibson 6

Two Centuries of Botanical Recording on Ailsa Craig
Mr. John Mitchell 26

The Reptiles and Amphibians of Kintyre
Dr. J.A. Gibson and Mr. Duncan Colville 36

Late Neolithic Settlement in Gryfesdale, Renfrewshire
Mr. Frank Newall 42

New Records of Natterer's Bat *Myotis nattereri* in Scotland
Mr. Carmen Placido 59

Fish Mortality in Forth and Clyde Canal, June 1972
Mr. Desmond Hammerton 63

The Mammals of Renfrewshire
Dr. J.A. Gibson and Mr. James Anderson 69

The Water-Hoglouse (*Asellus*) in West Scotland
Mr. J.D. Hamilton 109

The Return of the Fox to Kintyre
Mr. Duncan Colville and Dr. J.A. Gibson 111

Zoological Notes 114

Society News 117

Requests for Information 120

Published by The Renfrewshire Natural History Society
Department of Biology, Paisley College of Technology, Paisley

MUSEUM
17 DEC 1974
NATURAL HISTORY

The Western Naturalist

Volume Two 1973

Annual Subscription £2.00

A Journal of Scottish Natural History

THE WESTERN NATURALIST

A Journal of Scottish Natural History

Editorial Committee:

Dr. J.A. Gibson, Dr. John Hamilton
Dr. J.C. Smyth, Mr. J. Ian Waddington

DEPARTMENT OF BIOLOGY, PAISLEY COLLEGE OF TECHNOLOGY,
HIGH STREET, PAISLEY

The *Western Naturalist* is an independent journal, published by the Renfrewshire Natural History Society, devoted to the study of Scottish natural history, particularly, but not exclusively, to the natural history of the Western area. Although its main interests will probably centre on fauna and flora it is prepared to publish articles on the many aspects embraced by its title including Zoology, Botany, History, Environment, Geology, Archaeology, Geography etc.

All articles and notes for publication, books for review etc, should be sent to the Editors at the DEPARTMENT OF BIOLOGY, PAISLEY COLLEGE OF TECHNOLOGY, HIGH STREET, PAISLEY.

Contributions should be clearly written; whenever possible they should be typed, double-spaced, on one side of the paper, with adequate margins, and should try to conform to the general style and arrangement of articles and notes in the current number of the journal. Maps, diagrams and graphs should be drawn in black ink on white unlined paper. Photographs should be on glossy paper. Proofs of all articles will be sent to authors and should be returned without delay.

Authors of articles, but not of short notes, will receive thirty reprints in covers free of charge. Additional copies may be ordered, at cost, when the proofs are returned.

The *Western Naturalist* will be published at least twice a year and more often as required. The annual subscription is two pounds, which should be sent to the Editors at FOREMOUNT HOUSE, KILBARCHAN, RENFREWSHIRE. Members of the Renfrewshire Natural History Society will receive the journal free of charge. Members of other recognised natural history organisations may receive the *Western Naturalist* at a greatly reduced subscription; for details apply to the Editors at the subscription address.

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CONTENTS

Editorial 3

The Reptiles and Amphibians of Renfrewshire
Dr. J.A. Gibson 4

Bird Communities of the Mainland Section of Loch Lomond National Nature Reserve
Mr. Kenneth Williamson, Mr. E.T. Idle and Mr. J. Mitchell 15

Spiders and Phalangids of Inchcailloch, Loch Lomond
Dr. D.J. Curtis 29

The Distribution of Voles on the Clyde Islands
Dr. J.A. Gibson 40

Natterer's Bat *Myotis nattereri* in Stirlingshire
Mr. Carmen Placido 45

Notes on Two Winter Roosts of Daubenton's Bats near Wanlockhead, Dumfriesshire
Mr. W.S. Harvey 46

The Fauna of Some Rocky Shores in the Clyde Estuary
Dr. J.C. Smyth 53

A Preliminary Survey of the Intertidal Benthic Algae of the Clyde Estuary
Dr. Martin Wilkinson 59

Record Trout in Upper Clyde
Mr. J. Ian Waddington 70

Some Observations on Scavenging of Salmon *Salmo salar* Carrion
Mr. J.H. Cuthbert 72

The Freshwater Fishes of Kintyre
Dr. J.A. Gibson and Mr. D. Colville 75

Notes on the Marine Fishes of Kintyre
Dr. J.A. Gibson, Mr. D. Colville and Mr. J.C. Gemmell 84

Destruction of a Bronze Age Cairn on East Green Farm, Kilmacolm
Mr. Frank Newall 97

Zoological Notes 107

Society News 116

Requests for Information 120

EDITORS

Dr. J.A. Gibson
Dr. John Hamilton
Dr. J.C. Smyth
Mr. J. Ian Waddington

All items for publication should be sent to the Editors at Department of Biology, Paisley College of Technology, High Street, Paisley

Published by

THE RENFREWSHIRE NATURAL HISTORY SOCIETY

(Founded 1847)

EDITORIAL

We begin this Editorial with an apology, for our expressed intention to publish two parts of the journal during 1973 received an unexpected setback, and Volume Two is being published complete for 1973, as was Volume One for 1972. This was very much out of our control, owing firstly to repeated technical trouble at the printing press, and finally to the sudden and unexpected death of Mr. William Neilly, Printing Officer at Paisley College of Technology. Mr. Neilly had been of the greatest help to the *Western Naturalist* from its earliest days, and he was also a very nice and gentle man to whom nothing was ever too much trouble and who endeared himself to everyone with whom he came in contact. His early death was a sad blow to all who knew him, and we extend our sympathy to his wife and daughter for their great loss; he will be sadly missed by his many friends. Despite this grievous setback, however, it appears that the purely technical difficulties may now lie behind us, thanks largely to Mr. Neilly's assistance, and two parts of the journal are scheduled for 1974, in summer and winter. We already have many contributions in hand, but are very much open to receive additional papers and notes for publication, which should be sent to the Editors, as soon as possible, at the Department of Biology, Paisley College of Technology. We hope to issue Volume Three, part one, at the end of June 1974.

We are very grateful for the welcome which has been given to the new journal; it has been well reviewed in many places and messages of congratulation are arriving regularly, as are subscriptions in a steady stream. It is perhaps desirable to make the subscription position quite clear: members of the Renfrewshire Natural History Society receive the journal free of charge; the subscription for non-members, libraries etc, and other organisations is two pounds per year, but the Renfrewshire Society has generously decided that individual members of all other recognised natural history organisations can receive the *Western Naturalist* at half price, i.e. one pound per annum post free. All subscriptions, including enquiries about reduced rates, should be sent to the Editors at Foremount House, Kilbarchan, Renfrewshire.

The *Western Naturalist* is also very glad to exchange publications with all other relevant organisations, and many exchanges have already been arranged; requests for exchanges should be sent to the Editors at the subscription address.

Paisley December 1973.

THE REPTILES AND AMPHIBIANS OF RENFREWSHIRE

By J.A. GIBSON
Past President, Renfrewshire Natural History Society

As far as I can discover, the first significant reference to reptiles and amphibians in Renfrewshire appears in the *New Statistical Account* of 1845, where Eaglesham parish mentions the Lizard and the Adder, and the Abbey parish (Paisley) actually mentions seven species, namely the Adder, Lizard, Slow-Worm, Frog, Toad and two newts. These are included in an extensive account of the natural history of the parish, given on the authority of a Dr. A.R. Young "formerly of this town, but now resident at Dunoon, - an individual distinguished for his knowledge in.....natural science". As mentioned in the mammal paper (*Western Nat.*, 1: 69-108; 1972), it seems quite likely that this Dr. A.R. Young was Dr. Alexander Young (born 18th February 1802), the eldest brother of Morris Young (1822-1897), the Renfrewshire Society's founder.

The papers in the British Association *Handbooks* of 1876 and 1901 give some slight references to Renfrewshire, and Dr. Pride in his *History of the Parish of Neilston* (1910) gives some notes, fairly extensive for the period, but these must be treated with some caution. Over the years a few scattered notes have been published in local natural history journals and the Society's own *Transactions*, but the only previous account of any real importance remains that prepared by the Rev. Charles A. Hall for the Society's *Transactions* of 1915. The notes in the Cambridge County Geography series (Mort, 1919) add nothing of consequence.

This account of the reptiles and amphibians of Renfrewshire, therefore, is based on my own notes during the past thirty-five years, on what I have been able to discover from a search of the previous literature, and on the cumulative Society records, and here I should like to express my thanks to the many people who have contributed to the Society's records during the past half-century. If I have overlooked any published record I apologise in advance, and hope that this omission will be drawn to my attention, but I trust this will not occur often. This is the first detailed account of Renfrewshire reptiles and amphibians to have appeared for some sixty years and although my intention has long been well-known to all established naturalists throughout the county, it may be that the appearance of this list will stimulate other interested people to recollect incidents or details which can add to our knowledge. If anyone can significantly add to the following notes, therefore, I shall be

very glad to hear from him.

The numbers given in brackets at the end of each species are the Renfrewshire 10km squares (NS), taken from the sections on reptiles and amphibians in the *Atlas of Renfrewshire Vertebrates* (1970); it seems useful to repeat them here. The same symbols are used as in the *Atlas*: ordinary type means recorded in the square during the twenty years from 1951 to 1970; italics *(NS)* indicates recorded during the half-century from 1901 to 1950, but not later; italics *(NS)* indicates doubtfully recorded (or presumed escapes) during this century; species not recorded during the present century are not numbered. Only the Renfrewshire parts of over-lapping squares are included. For easy reference, the numbers of all the Renfrewshire 10km squares are given below:

(NS 17 27 37 47 16 26 36 46 56 66 35 45 55 65 44 54 64)

In the following list the arrangement and nomenclature follows *The British Amphibians and Reptiles* by Dr. Malcolm Smith (third edition, 1964), published by Collins, London.

REPTILES

SLOW-WORM *Anguis fragilis* Linnaeus 1758

At one time the Slow-Worm or Blind-Worm was regarded as rare in Renfrewshire. It was noted in the *New Statistical Account* of 1845 only from Abbey parish (Paisley), where it was said to have "been taken on the Gleniffer hills", but to be "very rare". What is perhaps more surprising, however, is that there is no mention of it from any other Renfrewshire parish in the 1845 *Account*, although some parishes gave extensive natural history notes. No Renfrewshire localities were given in the 1876 British Association *Handbook* and although the 1901 *Handbook* said "very common", this was a reference to the entire Clyde faunal area. Dr. Pride (1910) recorded the Slow-Worm from Neilston parish, but the Rev. Charles A. Hall in the 1915 paper said "Not often observed, but undoubtedly found in the County..... *A. fragilis* should be looked for among decayed leaves, in stone heaps and the crevices of old walls". Here he got the habitat certainly correct but the status probably wrong, and his final statement is probably nearest the truth "More careful observation might yield more frequent records".

I find this very puzzling, for Hall was an extremely industrious field naturalist and one who was not slow to explode old ideas where extensive field work could uncover the truth (see, for example, his work on the Bank Vole in Renfrewshire - *Scot. Nat.*, 1914: 19). At any rate, since at least the early 1930s

the Slow-Worm has been known to be common, if somewhat local, throughout Renfrewshire; it is probably most commonly found in the semi-derelict areas on the fringes of human habitation, and one of the best habitats for finding Slow-Worms is under abandoned slates or sheets of corrugated iron which have got partly overgrown and matted into the grass. Nevertheless there is some genuine evidence of decrease within recent years, and no-one nowadays is likely to repeat the feat of a small group from the Society, at the end of the last war, who found thirty Slow-Worms during an afternoon's ramble on the lower slopes of the Gleniffer Braes near Foxbar. Possibly the steady tidying-up of abandoned sites as urban growth spreads is a major factor in the decrease.

(NS -- 27 37 -- -- -- 36 46 -- -- 35 45 55 -- -- -- --)

LIZARD *Lacerta vivipara* Jacquin 1787

The Common or Viviparous Lizard has always been fairly well-known in Renfrewshire, and nearly all previous writers speak of it as common. It was recorded in the *New Statistical Account* of 1845 from Abbey parish (Paisley), and also Eaglesham parish, where it was said to be "often seen on the moors". The British Association *Handbook* of 1876 said "frequent" and gave Renfrewshire localities, and the 1901 *Handbook* also recorded it as generally distributed throughout the district. Hall (1915) said "frequent", without any further comment, and this remains the position to the present day.

Despite population spread the Lizard is still fairly common and well-distributed throughout most parts of our county; it is certainly commoner in the less-populous parts, but is also well-known around derelict and ruined buildings on the edge of habitation. Although well-known on the moors, I have not so far found it above 1,000 ft.

(NS -- 27 37 -- -- 26 36 46 -- -- 35 45 55 -- -- 54 *64*)

GRASS SNAKE *Natrix natrix* (Linnaeus) 1758

In 1900 Mr. J.M.B. Taylor, Curator of Paisley Museum and Vice-President of the Renfrewshire Society, wrote as follows (*Ann. Scot. Nat. Hist.*, 1900: 185):

> "On the 21st April 1900 a fine specimen of the Common Snake, or Ringed Snake (*Tropidonotus natrix*), was killed in Newton Woods, Abbey, Renfrewshire. This specimen was presented to the Paisley Free Museum by Sergeant-Major McKimmond. The specimen measures 24¼ inches in length, and has been placed in the Museum among the British Reptiles. Can you or any of your readers say anything about the occurrence of the Ringed Snake in Scotland? I have found no

mention of it being got in Scotland in any natural history literature referring to Scotland. The Adder is general in Renfrewshire, and in the same wood the Blind-Worm has been taken, but this is the first authentic capture of the Ringed Snake".

This elicited the following editorial comment:

"The Ringed Snake is not indigenous in Scotland. It is quite a common pet, however, and many examples escape and live at large, and it is possible that the species may thus in time become established in Northern Britain. We have examined many such escapes obtained in or near Edinburgh".

It seems to be quite clear that this was the first specimen of the Grass Snake known to have been taken in Renfrewshire, and certainly no previous records were known to Taylor, or to Morris Young, the Renfrewshire Society's founder and first Curator of Paisley Museum. Yet in 1901 Alfred Brown, in the account of Clyde reptiles and amphibians in the British Association *Handbook*, said "several examples have been taken near Paisley": there was no mention at all of the Grass Snake in the 1876 *Handbook*. Later Dr. Pride (1910) said of Neilston "It is reported on good authority that a living specimen of this snake was taken in the northern boundary of the parish in the summer of 1898", which precedes Taylor's 1900 record.

The assumption has always been that these Grass Snakes, and all the others which have been reported fairly regularly over the years, have all been escaped specimens, and this is probably correct; there is no evidence that we have ever had a native population. At one time the Grass Snake was a very popular pet with boys (forty years ago I had some myself) and nowadays Grass Snakes are still sold in county pet shops from time to time. It is likely that many of these will continue to escape, or be deliberately set free, and may continue to live in the wild for some time, but in my view it is very unlikely that a breeding population will ever become established in Renfrewshire. Slow-Worms, of course, are regularly killed and reported as 'Grass Snakes', sometimes, surprisingly enough, by otherwise quite knowledgeable people.

(NS -- *27* -- -- -- -- -- *46* *56* -- -- -- *55* -- -- -- --)

ADDER *Vipera berus* (Linnaeus) 1758

Local, and apparently never very common, throughout Renfrewshire, but always known to be present in small numbers; more or less confined to the wilder parts of the county, mainly the Eaglesham/Mearns moors, Misty Law range and Loch Thom areas; records away from these areas do occur, but are much rarer. One

found at Kilmacolm in 1905 was considered sufficiently unusual to be worth reporting in the Society's *Transactions* (Volume 2: 115; 1915).

The statement in the 1845 *New Statistical Account* that the Adder was among the "most common" of the reptiles in Abbey parish (Paisley) presumably referred to its status on the Gleniffer Braes, and in the account of Eaglesham parish the Adder was said to be "often seen on the moors. One.....bit a pointer dog on the tongue, which soon caused his death". The late J.M.B. Taylor, formerly Vice-President of the Society, said (1900) that the Adder was "general in Renfrewshire" and Dr. Pride (1910) in his *History of the Parish of Neilston* wrote "The gamekeeper informs the writer that the adder is still seen in Picketlaw and Moyne moors, in the south of the parish".

In Renfrewshire, hibernation appears to be from about the end of September until the end of March, although the dates can vary a great deal. In my experience Adders in Renfrewshire are most easily seen in spring, mostly on the lower slopes of the hills, just after they have emerged from hibernation; they are much more difficult to find later in the year.

No Adder I have found in Renfrewshire has measured more than eighteen inches, but the Society's records include a specimen killed at Garvocks on 9th June 1906 which was said to measure 22¼ inches, on the authority of Mr. Thomas Malloch. This is an astonishing size for Renfrewshire and would indeed be a very large Adder from anywhere in the Clyde faunal area, but Malloch was a most painstaking zoologist and a man not given to casual statements. In summer 1944 a bulky dead Adder measuring 16½ inches, which had been killed at Lochwinnoch, was brought to me at Paisley Museum, and on dissection was found to have swallowed whole a small female Weasel; the Weasel had been shot. In May 1954 an Adder 14 inches long was killed on the island in Roebank reservoir; the specimen was shown to me by Dr. J.S.M. Gray, County Medical Officer of Health. Adders, of course, are excellent swimmers.

Adders still occur throughout Renfrewshire in their traditional areas, but there is little doubt that there has been a substantial decrease in numbers during the past twenty-five years. This is presumably due partly to the increase in urban growth and also possibly to the fact that since the war many more people have been taking part in 'country activities', which is all to the good, apart from the fact that many people appear to kill Adders on sight and then report this as a 'surprising event'. Slow-Worms, too, are regularly killed and reported as 'Adders'.

It is probably worth recording, therefore, that in my official capacity as Renfrewshire Secretary of the British Medical Association I have made enquiries into the history of Adder bites in Renfrewshire, and can find no record of anyone having been treated for an Adder bite in the county during this century.

(NS -- 27 -- -- -- *26* 36 -- -- -- 35 45 -- -- -- *54* --)

AMPHIBIANS

CRESTED NEWT *Triturus cristatus* (Laurenti) 1768

Alfred Brown (1901) in the British Association *Handbook* gave "Abbey Parish, Paisley" as a locality for the Great Crested or Warty Newt, without comment. This was presumably taken from Dr. A.R. Young's natural history notes in the *New Statistical Account* of 1845, since I can discover no other published source of information. What Dr. Young actually listed was *"Triton aquaticus* and *vulgaris"* so it would appear that Brown took *aquaticus* to mean Crested Newt.

The Rev. Charles A. Hall in the Society's *Transactions* of 1915 said "Recorded for the Abbey Parish, Paisley, but not seen in recent years", which seems a polite way of saying that he knew of no acceptable records. Dr. Pride in his *History of the Parish of Neilston* (1910) said "found in the north of the Parish", which is the type of casual statement which makes his work so maddening. Dr. Pride was an admirable local historian, but he was no naturalist, and the natural history notes in his book are an exasperating mixture of apparently good observations and frank rubbish.

In my view none of these records is acceptable, and I regard the Crested Newts found by A.M. Stewart at Hawkhead pond, Paisley, in 1932 as the first genuine county records. Quite soon after this Stewart found a colony at Durrockstock Dam, Paisley, and many specimens were caught at Durrockstock until just after the war, but pollution and building operations ultimately destroyed both this and Hawkhead as suitable habitats.

The late John McKim, a former Secretary of the Society, exhibited some Crested Newts from the Giffnock quarries in 1946, but I know of no subsequent records. The late Mr. W.P. Perfect of Bridge of Weir also exhibited some Crested Newts in 1949, but most unfortunately I omitted to note the exact locality; I suspect it was Castle Semple, Lochwinnoch, but cannot be certain. In 1952 I myself, quite unexpectedly, caught some Crested Newts in a dredge at Loch Libo, Caldwell, but have no subsequent records despite repeated searches.

This, then, is the extent of the county records as far as I know; no authentic record until the early 1930s, and now no records at all for the past twenty years. I shall be very grateful for any additional information.

(NS -- -- -- -- -- -- -- *46 56* -- *35* 45 *55* -- -- -- --)

SMOOTH NEWT *Triturus vulgaris* (Linnaeus) 1758

Fairly common and widely distributed in all suitable areas throughout the county. As with all these creatures, however, pollution and building developments are cutting down the amount of available habitat. In Renfrewshire the Smooth Newt tends to be more common in the low-lying areas. On the higher ground the Palmate Newt is much commoner, although the two species are often found in close association, and there is certainly no hard and fast dividing line.

(NS *17* 27 37 47 16 26 36 46 56 -- 35 45 55 -- -- -- --)

PALMATE NEWT *Triturus helveticus* (Razoumowski) 1788

Fairly common and well distributed throughout Renfrewshire, although more commonly found on the moors and higher ground than in the low-lying parts of the county, where the Smooth Newt tends to be the commoner species (see Gibson, 1946).

(NS -- 27 37 -- -- 26 36 46 56 -- 35 45 55 -- -- 54 64)

COMMON TOAD *Bufo bufo* (Linnaeus) 1758

Fairly common and widely distributed throughout the county, although not nearly so plentiful as the Frog; no apparent change in status over the years. Recorded for Abbey parish (Paisley) in the *New Statistical Account* of 1845, and always noted as common by all subsequent authors.

(NS 17 27 37 47 16 26 36 46 56 *66* 35 45 55 -- -- 54 *64*)

NATTERJACK TOAD *Bufo calamita* Laurenti 1768

In the account of the reptiles and amphibians of the Clyde faunal area prepared for the British Association *Handbook* of 1901 by Mr. Alfred Brown, the Natterjack Toad is said to have been "lately found near Inverkip by J.M.B. Taylor, Paisley" and this record has been repeated by several subsequent writers.

J.M.B. Taylor was a former Vice-President of our Society and Morris Young's first assistant, and ultimately successor, as Curator of Paisley Museum. He had a well-merited reputation as a skilled and reliable zoologist, but I have been quite unable to find any reference to this record of the Natterjack Toad,

either published or in the records of the Society or Paisley Museum, and it seems very strange that such an important record should have received so little publicity at the time.

When the Rev. Charles A. Hall prepared his account of Renfrewshire amphibians for the Society's *Transactions* of 1915 both Taylor and Brown were unfortunately dead, so Hall was only able to quote the B.A. *Handbook* record and say "the latter record seems to lack confirmation", which was undoubtedly the case. The status of the Natterjack Toad in the West of Scotland remains something of a mystery (see, for example, *Transactions of the Buteshire Natural History Society,* 17: 71; 1969) and during the past thirty years I have spent a considerable amount of time investigating reports of supposed Natterjack Toads in Renfrewshire, some with very good field descriptions, but all without success. As is well known, the Natterjack Toad tends to occur in colonies, in sandy areas, and there is little territory suitable for it in Renfrewshire; nor is it likely that a large colony would be overlooked.

Were it not for J.M.B. Taylor's well-known reliability as a naturalist I feel this record would have been discounted long ago, but in fact there is no real evidence that Taylor was ever involved with it at all. The only evidence we have is the statement by Brown, whose paper certainly contains other apparent errors, and the most likely explanation is that this was a mistake on Brown's part with which he quite incorrectly linked Taylor's name. It is highly unlikely to have been an error by Taylor, who from all accounts was a painstaking naturalist of the old school who never claimed anything unless he had the evidence in his hand. At the very best, Taylor might have told Brown of a reported record being investigated by him (and subsequently found to be untrue) which Brown hastily published without waiting for confirmation. The phrase "lately found" implies some such situation, and Brown, possibly understandably, might have been very anxious to include what would have been a new Clyde record in his paper just about to be published.

All this is mere speculation, of course, and I apologise for writing at length, but it seems very desirable to clear J.M. B. Taylor, whose name has been linked, most improperly in my view, with this nebulous record. There is no evidence whatever to connect Taylor with the Natterjack Toad, apart from Brown's statement.

Moreover, references to this record keep turning up from time to time, and over the years the Renfrewshire Society has received numerous enquiries about it from interested zoologists; these enquiries are still coming in. All this is a very good example of how when a record once gets into print it is extrem-

ely difficult to get it out, and I should like to say as firmly as possible that as far as Renfrewshire is concerned this record is quite unconfirmed, is almost certainly incorrect, is long dead, and should be decently buried. If any Natterjack Toads turn up in the future, well and good.

COMMON FROG *Rana temporaria* Linnaeus 1758

Very common and widely distributed throughout the entire county. Despite the fairly extensive natural history notes in the *New Statistical Account* of 1845 the Frog is mentioned by only one parish, Paisley, where it is noted as common; one can only assume that it was too well known to be considered worth specially mentioning in the accounts of the other parishes.

Very occasionally localised small 'plagues' of Frogs occur, and are reported by the local press in dramatic language. One of these I witnessed personally. At our previous home, Foxbar House, south of Paisley on the lower slopes of the Gleniffer Braes, we had an outdoor swimming pool, populated, I hasten to add, largely by Frogs and Newts. Close by, in another part of the grounds, there was a small loch some 100 yards long, also heavily populated by Frogs. On the morning of 14th June 1957 what seemed to be almost the entire population of young Frogs left the water and made their way over the neighbouring Foxbar road, alongside our boundary, completely blocking the road for a distance of thirty paces. In several areas I genuinely could not see any part of the lawns or the road tarmac for a moving carpet of small Frogs, inches deep. The Corporation refuse wagon came along at that moment and the driver stopped in astonishment; the wagon could not get started again for the wheels slipping in a mess of crushed Frogs - much worse than snow - and was stranded for some twenty minutes. A swarm of birds, mostly Rooks, Magpies, Jackdaws and members of the thrush family, descended on the Frogs, much like seagulls behind a fishing boat gutting fish, and were nearly oblivious to the presence of man. One of the refuse collectors twice caught and picked up a Rook, which as soon as it was released dashed back into the fray. The whole thing was virtually over in an hour, with scarcely a Frog to be seen. Occurrences along roughly similar lines have been witnessed by other observers.

Although most common in the low lying areas, as one would expect, Frogs are present on the moors and have been found high on the slopes of Misty Law at approximately 1500 feet.

(NS 17 27 37 47 16 26 36 46 56 -- 35 45 55 65 -- 54 64)

EDIBLE FROG *Rana esculenta* Linnaeus 1758

In his 1915 paper Hall said "Mr. A.M. Stewart says he

thinks a specimen was taken by the late Morris Young at Jenny's Well, Paisley, but owing to the unfortunate disappearance of the Society's Records, we are not in a position to confirm this. There is no recent record, and any appearance of the species in the Shire in the past could only be casual".

It is perhaps desirable to explain what lay behind this statement. The Renfrewshire Society was founded by Morris Young in 1847 as the Renfrewshire Naturalists' Society, and after some detailed, but apparently friendly, negotiations the Renfrewshire Naturalists' Society merged with Paisley Philosophical Institution in 1864 to form the Natural History section of Paisley Philosophical Institution, with Morris Young as convener. This combined society founded Paisley Museum, with Morris Young as Curator, in 1871, but some time after this repeated disputes broke out, which in 1892 ultimately resulted in the natural history society again taking separate existence, as Paisley Naturalists' Society. At this stage Paisley Philosophical Institution refused to hand over the records, not only of the Society when it had functioned as the Natural History section of the Philosophical Institution, but also the Society's original records prior to 1864, which had all been lumped together at the amalgamation. Hence the difficulty the Rev. C.A. Hall was in; Morris Young was dead so he had no one to consult, and he could not get access to the records. Moreover, he himself was trying to effect a reconciliation between the two societies and so wished to avoid any tactless remarks; hence the use of the euphemistic 'unfortunate disappearance'. In the year 1917, however, Hall himself actually became President both of the Naturalists' and of the Philosophical; and while in this position of double influence he managed to heal the breach and the Society's records were ultimately returned. Most were placed in the custody of A.M. Stewart F.R.E.S., the Society's historian, but disastrously were again lost, this time for ever, when most of Stewart's papers, including the Society's records, were mistakenly destroyed almost immediately after his death in 1948 (see *Western Nat.*, 1: 69-70, 74; 1972).

I knew A.M. Stewart well in his later years, and he told me the records showed that the specimens of the Edible Frog had actually been introduced to Jenny's Well in the 1860s by Morris Young, who had obtained some from the south of England. Apparently they did not get established and no further records were known.

I have heard rumours of further efforts to introduce the Edible Frog to Renfrewshire, but have no firm evidence, and shall be grateful for any information received.

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Dr. J.A. Gibson, Foremount House, KILBARCHAN, Renfrewshire.

BIRD COMMUNITIES OF THE MAINLAND SECTION OF LOCH LOMOND NATIONAL NATURE RESERVE

By KENNETH WILLIAMSON
British Trust for Ornithology

EDWARD T. IDLE and JOHN MITCHELL
Nature Conservancy Council

In the spring of 1972, from 27th May to 10th June inclusive, a British Trust for Ornithology expedition under the leadership of Kenneth Williamson visited Balmaha, Stirlingshire, in order to carry out mapping censuses of the breeding birds of the Loch Lomond National Nature Reserve. The Reserve, which was declared on 4th December 1962, and of which John Mitchell is the Nature Conservancy's senior warden, includes the islands of Inchcailloch, Clairinsh, Torrinch and Creinch, where census plots were established in the mixed oak woods. This work will be reported on separately (Williamson, in press). Much the greater part of the reserve comprises the Ring Point and its adjoining fields, marshland and small woods in the county of Dunbartonshire (see *Fig 1*) and this paper deals with bird communities in the area, which covers 177 hectares (436 acres).

RING POINT

The low flat promontory of Ring Point is bounded by Loch Lomond to the west and the Endrick Water to the east. It is probably of fluvio-glacial origin with a base of fine particled clay covered with sand deposited by the Endrick Water near its mouth, and subsequently worked by the waves and wind of the prevailing westerlies. Ring Point is about 1,300 metres long and averages between 200-300 metres wide, being indented along the loch shore by a number of small pools or lagoons, many of which dry out in summer in normal rainfall years. The vegetation of the higher parts of Ring Point, roughly two metres above mean loch level, is *Agrostis/Festuca* grassland, which has been closely grazed by cattle since 1968, with substantial 'islands' of gorse *Ulex europaeus*. The lower levels of Ring Point are wetter, frequently inundated by the loch during the winter and covered with vegetation dominated by *Deschampsia cespitosa* and *Juncus effusus*. Vigorous patches of alder *Alnus glutinosa*, and willows *Salix* spp., with *Prunus spinosa* and *Rubus fruticosus* occur on the river bank, particularly from the mid-point southwards.

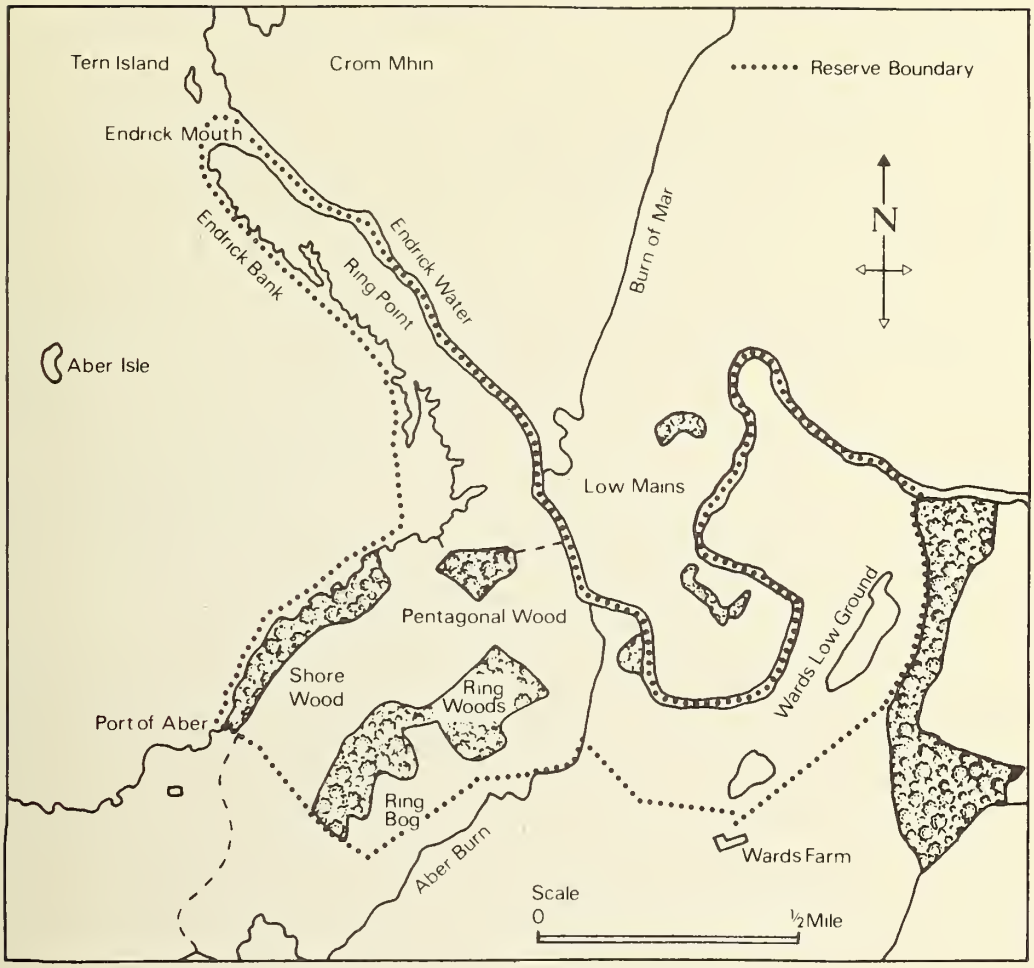

Fig. 1

Loch Lomond National Nature Reserve -
Mainland Area.

Photograph: The Ring Point and Endrick Mouth, Dunbartonshire.

On the right of the picture, at the base of the Point, is Pentagonal Wood and part of Shore Wood, with the Ring Wood East lying beyond.

(Photograph by courtesy of the *Director in Aerial Photography, University of Cambridge*)

The gently sloping loch shore sandflats are completely inundated each winter and are covered with an open *Agrostis/Carex nigra* sward containing a number of ephemeral annual plants.

The patches of woodland and the gorse 'islands' are used by a number of passerine species, but as a nesting site the Ring Point is primarily important for its breeding waders, terns and ducks. Ring Point is also used as a winter wildfowl resort and serves as a flight-line for seasonal migrants.

A census plot extending from the tip of the Ring Point southwards as far as the outermost field hedgerow of the neighbouring farmland (continuing the edge of Pentagonal Wood - see map) was laid out by the Conservation Corps in late April with a 100 m. grid. This included the shore-line and inner shallows and covered in all about 44 hectares (109 acres). The B.T.O. team set up 50 m. grids in three of the small woods inland from Ring Point: Pentagonal Wood at its base, Shore Wood beside the loch, and an interesting and ecologically diversifying stand of birch on water-logged ground known as Ring Wood East.

A mapping census is a difficult undertaking in an open area where the bird population comprises largely waterfowl and waders, and there is no doubt that the Ring Point survey was subject to greater inaccuracies than the work done in the woods. The margin of error is difficult to estimate, but is thought to be not more than two or three pairs either way for the commoner waders. In view of this, and the fact that the area used includes the loch shallows (which could be said to be part of the feeding territory in some cases), density figures must be taken as a rough guide only.

Eight census visits were made to Ring Point to map the activities of all birds seen and heard (and nests found) in relation to the grid. Analysis of the results indicates a total of about 117 territories, shared among 31 species, i.e. approximately 270 breeding pairs per km^2 (66 pairs per 100 acres). A systematic list, with comments, is given below.

MALLARD *Anas platyrhynchos* The best counts were three on 29th and two on 31st May.

TEAL *Anas crecca* A pair was seen on two dates, 31st May and 5th June.

TUFTED DUCK *Aythya fuligula* A single bird on 28th and two on 31st May. (Casual observations suggest a few breeding pairs of each of these three species thinly spread throughout the Endrick Mouth area).

RED-BREASTED MERGANSER *Mergus serrator* There was a pair at the base of the promontory, and once a pair at the tip also.

PHEASANT *Phasianus colchicus* One pair.

COOT *Fulica atra* Two pairs.

OYSTERCATCHER *Haematopus ostralegus* Probably five pairs. Non-breeders were sometimes present but more often they gathered, up to 20-30 together, in fields between the base of Ring Point and Ring Wood East.

LAPWING *Vanellus vanellus* Perhaps twelve pairs, judging from the nests found during census visits. The first young were noted on 29th April. Independent counts by J.M. and D.N. Brooks of birds giving distraction display suggested nine pairs on 7th May.

RINGED PLOVER *Charadrius hiaticula* Two pairs. R.K. Pollock (*in litt.*) mentions nests with two eggs on 14th May and one egg on 21st June.

COMMON SNIPE *Capella gallinago* Three pairs.

CURLEW *Numenius arquata* One pair had their chicks on wet ground between Ring Point and Pentagonal Wood.

DUNLIN *Calidris alpina* Usually recorded as a small flock of up to ten birds on the loch shore. On 29th May J.M. and Carmen Placido observed a pair *in cop.* Near the same spot in July two of the voluntary wardens watched injury-feigning, which suggests that nesting had occurred. Pairs bred in 1946, 1949, 1957-59 and 1969.

COMMON SANDPIPER *Actitis hypoleucos* A nest with three eggs on 21st June (R.K. Pollock, *in litt*).

REDSHANK *Tringa totanus* A close estimate would be ten pairs. There were nests with one and four eggs on 29th May and with one and three eggs on 5th June.

BLACK-HEADED GULL *Larus ridibundus* One pair. An estimated 5,000 pairs occupied Ring Point and Bog from the mid-1930s, a swift decline taking place as a result of egg-collecting during the war (I.C. Christie, *in litt.*; and Wood, 1954).

LESSER BLACK-BACKED GULL *Larus fuscus* Some youths were apprehended raiding Ring Point on 6th June and among eggs they had taken were those of a medium-sized gull, probably of this species, which had been seen on a few occasions, including two adults and two immatures on 29th May and a party of eight on 30th.

COMMON TERN *Sterna hirundo* A small colony of six pairs (nests found, but later robbed) was established at the tip of Ring Point. J.M. found 19 fresh nests with eggs on nearby Tern Island on 3rd July, and a nest on Ring Point itself. The colony

fluctuated between 15-30 pairs from the mid-1930s to about 1960 but had declined to five pairs by 1968.

SKYLARK *Alauda arvensis* About ten pairs on the open grassland.

LONG-TAILED TIT *Aegithalos caudatus* A family party was seen on several visits, frequenting the alders and gorse.

WREN *Troglodytes troglodytes* Two territories were found along the alder and willow strip, extending to nearby gorse clumps.

SONG THRUSH *Turdus philomelos* Two territories occupied a similar habitat to the Wrens'.

BLACKBIRD *Turdus merula* Five pairs, among the alders and willows and the nearby gorse clumps.

ROBIN *Erithacus rubecula* Two territories among the alders and willows.

SEDGE WARBLER *Acrocephalus schoenobaenus* Five territories, in the riverside scrub and the gorse patches.

WHITETHROAT *Sylvia communis* One territory at the southern end. Birds were seen twice (but song was not heard) in gorse 'islands' towards the tip of Ring Point. There were several pairs in this suitable habitat up to 1968 but none in 1969 when the species 'crashed' on a national scale (Batten, 1972).

WILLOW WARBLER *Phylloscopus trochilus* Ten pairs, among the alders and their associated scrub.

GOLDCREST *Regulus regulus* One pair in the gorse bushes, feeding three young on 29th May; also in the alders on 4th June.

DUNNOCK *Prunella modularis* Nine territories were distributed between the strip of alders and the gorse patches.

LINNET *Acanthis cannabina* A nest with five eggs was found in a gorse bush on 28th May, the first definite breeding record for the Reserve.

CHAFFINCH *Fringilla coelebs* This was the commonest passerine, seven of the fourteen pairs having territories based on the 'islands' of gorse. This is the dominant species in the sessile oak woods of the Loch Lomond region, but its abundance in this much more open habitat was unexpected.

REED BUNTING *Emberiza schoeniclus* Three pairs were present in the river side scrub.

OTHER SPECIES

The south-east corner of Loch Lomond now holds one of the

biggest inland concentrations of Shelduck *Tadorna tadorna* in Scotland; the first positive breeding on Loch Lomond was in 1877, when a young bird was shot by the owner of Ring Point at that time (Lumsden, 1881). The biggest count during a census visit was 59 birds, and although 22 were present on one day only 12-16 were recorded on three other dates. A family party including six juveniles was seen on 5th June. In twenty-five years of recorded observations no occurrence is known of actual nesting on Ring Point, breeding taking place mostly on the islands. Ring Point and its surroundings are a valuable feeding area however.

Eight Mute Swans *Cygnus olor*, probably forerunners of the moulting flock that builds up each summer, were present throughout the census period. There has not been a nest on Ring Point since 1967.

Other species seen, but clearly not nesting on Ring Point, were Heron *Ardea cinerea*, Cormorant *Phalacrocorax carbo*, Whooper Swan *Cygnus cygnus* (a summering bird), Bar-tailed Godwit *Limosa lapponica* (two on 29th May), Swift *Apus apus* (and passing hirundines), Blue Tit *Parus caeruleus*, Meadow Pipit *Anthus pratensis*, Pied and Grey Wagtails *Motacilla alba* and *M. cinerea*, and Lesser Redpoll *Acanthis flammea*. The Redpolls were active among the alders on 31st May and 4th June but were probably visiting from across the river Endrick. During one census visit a Green Woodpecker *Picus viridis* was heard 'yaffling' on the far side of the river.

THE OAK WOODS

The Pentagonal Wood (about 1½ hectares or 3¾ acres) is a small mixed wood situated at the southern end of the Ring Point. It contains a number of large mature oaks mixed with tall Norway spruce, Scots pine and European larch on the higher, better drained ground, and alder and birch in the wetter sites nearer the loch and in overgrown drainage channels. The shrub layer is poorly developed except for a thicket of blackthorn *Prunus spinosa* on the western edge, but a number of dead and fallen trees provide a range of intermediate nesting sites. Since 1968 the wood has been fenced off from cattle and the ground vegetation largely left undisturbed. It is now increasingly luxuriant and dominated by *Rubus fruticosus*, *Holcus mollis*, *Endymion nonscriptus* with *Deschampsia cespitosa* and *Chrysosplenium oppositifolium* in the wetter areas and bracken on the drier sites along the southern edge.

The Shore Wood (about 3 hectares or 7¼ acres) is a narrow, thirty metres wide, oak-dominated wood lining the loch shore east from the Reserve entrance at Port of Aber. The stems of

the trees are derived from coppiced stools which were left unthinned for approximately fifty years until 1969, when 500 were removed in an attempt to increase crown size. The stems are narrow and have small interlocking crowns. In the apparently mineral-rich zone along the loch shore the oak canopy is replaced by a mixture of ash, oak, sycamore and hawthorn. The Shore Wood is used as shelter and grazing for cattle during the winter and consequently the shrub layer is virtually non-existent, though in a few places brambles and hawthorn manage to survive. The heavy, boulder-clay soil supports a number of base-rich plant communities including such species as *Prunella vulgaris*, *Poa nemoralis* and *Cardamine amara*.

The breeding bird community was similar to that on the Reserve islands with Chaffinch the dominant species among the oaks, but superseded by Willow Warbler in the small areas where pioneer growth such as birch, alder and thorns predominated. Together these two co-dominant species made up 39 per cent of the community in Shore Wood. The subdominant species, indicative of the earlier influence of coppice management, were Robin and Wren, each making 11 per cent of the community. The Great Tit was the commonest tit. Whitethroat and Yellowhammer were very much woodland-edge species associated closely with the adjacent gorse patches. In Pentagonal Wood the Willow Warbler, forming 18 per cent of the total, was the commonest bird with both Wren and Robin (each 12 per cent) sub-dominant.

Both woods had single pairs of Common Sandpiper (one nest with four eggs was fifty yards from the water's edge). Based on Pentagonal Wood, but sometimes visiting Shore Wood, were Great Spotted Woodpecker *Dendrocopos major* (nested in Pentagonal Wood in 1963), Carrion Crow *Corvus c.corone* and Treecreeper *Certhia familiaris*. Visiting species were Buzzard *Buteo buteo* (there was a nest in Pentagonal Wood in 1971), Cuckoo *Cuculus canorus*, Tree Pipit *Anthus trivialis*, Pied and Grey Wagtails and Reed Bunting. Two nests of the Rook *Corvus frugilegus* were built in Shore Wood in 1970. Woodcock *Scolopax rusticola*, Tawny Owl *Strix aluco*, Long-tailed Tit and Spotted Flycatcher *Muscicapa striata* have all bred in Pentagonal Wood within recent years.

THE BIRCH WOOD

Ring Wood East (7 hectares or 17½ acres) is predominantly birch of even age about 80-100 years old, showing only limited regeneration. It is clear from early Ordnance Survey maps that the woodland probably arose by natural regeneration in open wet *Juncus*-infested grassland. The birch canopy is virtually monospecific with a number of gaps left by decayed or windthrown

timber. On the higher and drier ground in the south-west, the birch is replaced by mixed woodland, similar in structure and probably contemporaneous with Pentagonal Wood. This higher part of Ring Wood East is surrounded by an overgrown beech hedge and a drainage ditch of doubtful effectiveness. Apart from some regeneration of birch, and in the drier areas, beech, the shrub layer is absent. The birch-dominated area has a number of deep pools around upturned roots and the wet ground flora is dominated by tussocks of *Sphagnum* spp. *Polytrichum commune* and *Rhytidiadelphus squarrosus* with *Carex rostrata* and *Juncus effusus* occupying some of the wet ditches. Some natural thinning has also resulted from severe attacks by the fungi *Piptoporus betulinus* and *Fomes fomentarius* (Kerr, 1966). Because of the waterlogged ground, the fallen trees and frequent deep pools below upturned root-systems, the wood is a difficult one to census, but its strange beauty and exciting primaeval character are more than ample compensation. The territorial birds are listed in *Table 1* and their dominance positions (the percentage each occupies in the breeding bird community) are shown in *Figure 2*.

On the outskirts of the wood, and with largely extralimital territories fringing Ring Bog, were two pairs each of Sedge Warbler and Reed Bunting. It is possible that the Magpies were nesting elsewhere since no nest was located after leaf fall. Whitethroat and Lesser Redpoll were noted on single occasions only. The Buzzard had a nest containing two young.

OTHER AREAS

Unfortunately, time did not allow a close examination of two other ornithologically interesting areas, Wards Low Ground and the Ring Bog.

The Wards Low Ground consists of rough *Agrostis/Festuca* grassland, grading into *Carex* reedswamp around the edges of the permanent, though sometimes shallow, lagoons. Though the water level of Wards Ponds is partially controlled by a sluice gate, allowing the development of reed-swamp and *Deschampsia cespitosa* - *Juncus effusus* grassland during the summer, high rainfall provides large undisturbed pools for wildfowl in the winter. Breeding birds include Mallard, Teal, Wigeon *Anas penelope* (occasional), Shoveler *Anas clypeata*, Tufted Duck, Coot *Fulica atra*, Lapwing, Snipe and Redshank.

The Ring Bog is part of a mesotrophic mire showing a patchwork of small pools and associated floating vegetation, areas of willow carr and swamp and mixed fen communities. It is underlain by deep deposits of fluvio-glacial clays and silts and shows parallel zonation of its plant communities as a result of years of attempted drainage for hay-cutting and grazing. The

BIRD COMMUNITY STRUCTURE
RING WOOD EAST

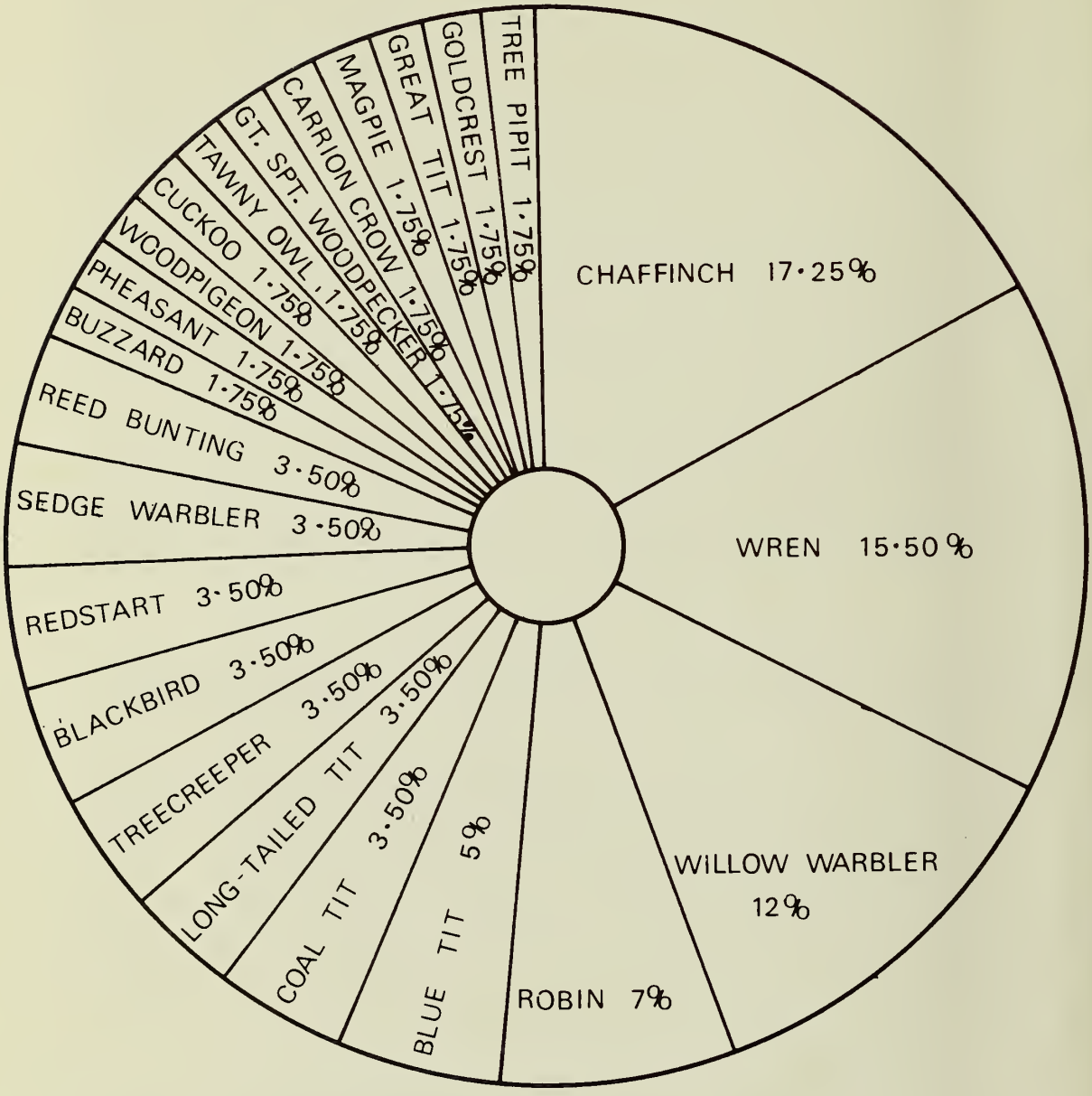

Fig. 2.

Ross Drain, the main drainage channel is clearly marked by the parallel zonation of large, pure stands of *Phalaris arundinacea*. The plant communities are often inundated in the winter by inflowing streams or the backing up effect of the Loch. On slightly higher levels at the edges of the Ring Woods *Juncus acutiflorus* mire replaces the more hydrophytic bog communities. Only the northern edges of Ring Bog are now grazed, the rest having been fenced off from cattle in 1968. Snipe and Redshank are the most apparent waders and the Bog holds the Reserve's only pairs of Grasshopper Warbler *Locustella naevia*. A pair of Canada Geese *Branta canadensis* nested in 1968, 1969 and 1970.

SUMMARY

A British Trust for Ornithology team carried out breeding-bird censuses in the spring of 1972 on parts of the Loch Lomond National Nature Reserve, Stirlingshire and Dunbartonshire.

This paper gives the results of censuses on Ring Point, an open grassy area with pools at the mouth of the Endrick Water; in the oak-dominated Pentagonal and Shore Woods, and in the wet birch wood known as Ring Wood East. Detailed topographical and vegetation descriptions of the separate areas are given

Some thirty species probably bred on Ring Point, fourteen of these being passerines. The dominant waders were Lapwing (about twelve pairs) and Redshank (about ten pairs) with Oystercatcher (five) and Common Snipe (three) well represented. Among passerine species dependent on alders and willows along the river bank, and in 'islands' of gorse, the Chaffinch (fourteen pairs) was dominant with Willow Warbler (ten pairs) next most common and five pairs each of Blackbird, Sedge Warbler and Dunnock. The open grassland supported ten pairs of Skylarks.

In Shore Wood Chaffinch and Willow Warbler were co-dominant, the two making up about 39 per cent of the total bird community. Willow Warbler was the commonest bird in Pentagonal Wood (dominance figure 18 per cent) with Wren and Robin sub-dominant (each 12 per cent). The Ring Wood East had fifty-nine pairs (including seven 'edge' territories) of twenty-four species, the commonest being Chaffinch (ten pairs) Wren (nine pairs) and Willow Warbler (seven pairs). (*Table 1*).

ACKNOWLEDGEMENTS

The authors are grateful to the following members of the British Trust for Ornithology Bird Census Expedition 1972, which worked on the Loch Lomond National Nature Reserve from 27th May to 10th June inclusive: Ben and Ann Bailey, Jack Cook, Bill Ditch, Tom Hiscock, Kitty MacDuff-Duncan, Jim May, Jill Polonie-

Table 1 WOODLAND BREEDING BIRDS
Loch Lomond N.N.R. (Mainland Area)

Species	OAK		BIRCH
	Shore Wood	Pentagonal Wood	Ring Wood East
BUZZARD *Buteo buteo*	-	-	1
PHEASANT *Phasianus colchicus*	-	-	1
COMMON SANDPIPER *Actitis hypoleucos*	1	1	-
WOODPIGEON *Columba palumbus*	-	-	1
CUCKOO *Cuculus canorus*	-	-	1
TAWNY OWL *Strix aluco*	-	-	1
GREAT SPOTTED WOODPECKER *Dendrocopos major*	-	1	1
CARRION CROW *Corvus c. corone*	-	1	1
MAGPIE *Pica pica*	-	-	1
GREAT TIT *Parus major*	3	1	1
BLUE TIT *P. caeruleus*	1	1	3
COAL TIT *P. ater*	2	1	2
LONG-TAILED TIT *Aegithalos caudatus*	-	-	2
TREECREEPER *Certhia familiaris*	-	1	2
WREN *Troglodytes troglodytes*	5	4	9
SONG THRUSH *Turdus philomelos*	1	1	-

Species	OAK		BIRCH
	Shore Wood	Pentagonal Wood	Ring Wood East
BLACKBIRD *T. merula*	2	2	2
REDSTART *Phoenicurus phoenicurus*	1	1	2
ROBIN *Erithacus rubecula*	5	4	4
SEDGE WARBLER *Acrocephalus schoenobaenus*	-	-	2*
COMMON WHITETHROAT *Sylvia communis*	1*	1*	-
WILLOW WARBLER *Phylloscopus trochilus*	9	6	7
GOLDCREST *Regulus regulus*	1	2	1
DUNNOCK *Prunella modularis*	1	1	-
TREE PIPIT *Anthus trivialis*	-	-	1
LESSER REDPOLL *Acanthis flammea*	2	1	-
CHAFFINCH *Fringilla coelebs*	9	3	10
YELLOWHAMMER *Emberiza citrinella*	2*	-	-
REED BUNTING *E. schoeniclus*	-	-	2*
Totals	46	33	58
(Species)	16	18	23

* Territory occupying woodland edge and adjacent scrub

cka, Hester Rodgers, Ralph and Frieda Stanford, Maire Tugendhat, Wallace Wild, Pip and Eve Willson, Harold Wilson, John Wilson and David C. Wood.

Thanks are also due to Mrs Frier and Mrs Maclaren of Balmaha for their help, and to Dr. I.R. Maclaren who allowed us the use of the Mountain Rescue Centre at Drymen. Our thanks is also due to Carmen Placido, Reserve Warden, and to those members of the Conservation Corps (Scotland) who laid out the grid markings on the selected census plots prior to our visit.

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Mr. Kenneth Williamson, B.T.O., Beech Grove, Tring, Hertfordshire, HP23 5NR.

Mr. Edward T. Idle, Nature Conservancy Council, The Castle, Loch Lomond Park, Balloch, Dunbartonshire, G83 8LX.

Mr. John Mitchell, Nature Conservancy Council, 22 Muirpark Way, Drymen, Glasgow, G63 ODX.

SPIDERS AND PHALANGIDS OF INCHCAILLOCH, LOCH LOMOND
1 - General Considerations

By DAVID J. CURTIS
Department of Biology, Paisley College of Technology

Introduction

The island of Inchcailloch is situated close to Balmaha in the south-eastern part of Loch Lomond (O.S. grid reference NS410905) and forms part of the Loch Lomond National Nature Reserve. The island is covered with semi-natural deciduous and coniferous woodland, together with a rich understorey vegetation. Most of the data on the spiders and phalangids have been obtained by means of pitfall traps and thus knowledge is most detailed for the ground-active fauna. This information together with some obtained by other sampling techniques is presented here.

A pitfall sampling program commenced in the late summer of 1971 and is still in progress. At each of four sites, twenty small plastic jars were sunk into the ground to capture surface-active invertebrates. The traps were emptied at approximately weekly intervals for the first year and thereafter at monthly intervals.

Sites

Site 1 is located in oak *Quercus robur* woodland; the field and ground layer vegetation includes *Luzula sylvatica* (Huds.) Gaud, *Pteridium aquilinum* (L.) Kuhn, *Agrostis stolonifera* L., *Rubus fruticosus* agg., *Poa* sp., *Dryopteris* sp., *Endymion nonscriptus* (L.) Garcke, *Oxalis* sp. The soil at this site is an acid brown earth overlying lower old red sandstone and conglomerates.

Site 2 is an alder carr in which the field layer and ground layer vegetation includes *Luzula sylvatica*, *Agrostis stolonifera*, *Rubus fruticosus*, *Dryopteris* sp., *Endymion nonscriptus*, *Oxalis* sp., *Deschampsia caespitosa* (L.) Beauv., *Nasturtium microphyllum* (Boem.) Rchb., *Galium palustre* L., *Veronica chamaedrys* L., *Lonicera periclymenum* L., *Filipendula ulmaria* (L.) Maxim., the moss *Thuidium tamariscinum*, as well as *Pteridium aquilinum*. The substrate in the alder carr is a poorly drained acid peaty soil, again over lower old red sandstone.

Site 3 is located near the summit of the North Hill amidst mainly *Pinus sylvestris*, together with some birch and rowan.

TABLE 1: INCHCAILLOCH PHALANGIDS

Species	Pitfall trap sites			
	1	2	3	4
Nemastoma bimaculatum (Fabricius)	+	+	+	+
Nemastoma chrysomelas (Hermann)	+	+	+	+
Mitopus morio (Fabricius)	+	+	+	+
Oligolophus agrestis (Meade)	+	+	+	+
Oligolophus tridens (C.L.Koch)	+	+	-	-
Oligolophus hanseni (Kraepelin)	+	+	+	+
Odiellus palpinalis (Herbst)	+	+	+	+
Odiellus meadei (Cambridge)	+	+	+	+
Lacinius ephippiatus (C.L.Koch)	+	+	-	+
Platybunus triangularis (Herbst)	+	+	+	+
Megabunus diadema (Fabricius)	-	+	+	-

+ indicates presence

The ground and field layer vegetation around this site includes *Deschampsia flexuosa* (L.) Trin., *Calluna vulgaris* (L.) Hull, *Vaccinium myrtillus* L., *Luzula sylvatica*, *Polypodium vulgare* L., as well as several mosses such as *Dicranum majus*, *Dicranum scoparium*, *Dicranella heteromalla*, *Leucobryum glaucum*, *Lophocolea cuspidata*, *Bazzania trilobata*, *Hypnum cupressiforme*, and nearby clumps of *Pteridium aquilinum*. The soil on the North Hill is a very acid peaty ranker overlying old red sandstone and conglomerates.

Site 4 is situated in the Central Valley in woodland comprising mainly *Quercus robur*, as well as other deciduous trees such as hazel. The field layer here includes mostly *Rubus fruticosus* with some *Pteridium aquilinum*, *Dryopteris* sp., *Oxalis* sp., *Melandrium rubrum* (Weig.) Garcke, *Deschampsia caespitosa*, growing in an acid brown podzolic soil overlying old red sandstone and conglomerates.

The four sites studied by pitfall sampling thus have con-

trasting field and ground layer floras, as well as different canopy species and although the soils vary they are all acid soils overlying lower old red sandstone. Of the two oak-dominated woodland stations, site 4 is considerably wetter than site 1, though not as wet as site 2 in the alder carr. Site 3 differs from the other sites largely in the presence of dense clumps of mosses, as well as *Calluna* and *Vaccinium* plants which persist throughout the winter months, in contrast to the other sites where most of the aerial plant structures diminish during the winter.

Harvestmen

Eleven species of harvestmen have been taken on the island. These are listed in Table 1. Most of these appear to be fairly generally distributed over the island and are mainly inhabitants of the ground and lower field layers. *Megabunus diadema* is a beautiful harvestman which occurred in the pitfall traps rather surprisingly as its usual habitat on the island is the trunks of trees and rock surfaces, in which places it blends extremely well with lichens. One surprising ommission from the list of phalangids is *Leiobunum rotundum* (Latreille) which does occur on the eastern banks of Loch Lomond and would be expected on the bushes and trees of Inchcailloch.

Spiders

Spiders are represented by 101 species captured to date, approximately 70% of which belong to the family Linyphiidae. Members of the families Dictynidae, Dysderidae, Gnaphosidae, Clubionidae, Anyphaenidae, Thomisidae, Lycosidae, Agelenidae, Theridiidae, Tetragnathidae and Argiopidae are listed in Table 2, while the linyphiids are given in Table 3. Some of the spiders occurred in relatively large numbers at all four pitfall trap stations, e.g. *Walckenaera acuminata, Monocephalus fuscipes, Centromerus sylvaticus, Lepthyphantes zimmermanni.* Species such as *Lycosa lugubris, Micrargus herbigradus, Oreonetides abnormis, Macrargus rufus* and *Lepthyphantes tenuis* occurred in moderate quantities at all the sites, while very small numbers of some species were taken at most of the sites, e.g. *Trochosa terricola, Trachynella nudipalpis, Gongylidiellum vivum, Erigonella hiemalis, Porrhomma pallidum* and *Lepthyphantes minutus.* Spiders which appeared fairly abundantly in traps at all sites but which were most common at a particular site include *Gonatium rubellum* (at site 3), *Tapinocyba pallens* (at site 3), *Diplocephalus picinus* (mostly at site 1, absent from site 3), *Microneta viaria* (at site 1) and *Lepthyphantes alacris* (at site 3). *Hahnia hel-*

TABLE 2: INCHCAILLOCH SPIDERS - Families Dictynidae - Argiopidae

Species	Pitfall trap sites 1	2	3	4	Other habitats
DICTYNIDAE:					
Ciniflo fenestralis (Stroem)	-	+	+	-	tree trunks
C. similis Blackwall	-	-	+	-	
DYSDERIDAE:					
Harpactea hombergi (Scopoli)	-	-	-	-	tree trunks
Segestria senoculata (L.)	-	-	+	-	tree trunks
GNAPHOSIDAE:					
Drassodes pubescens (Thorell)	-	-	+	-	
Micaria subopaca Westring	+	-	-	-	
CLUBIONIDAE:					
Clubiona compta C.L.Koch	-	-	+	-	tree trunks
Agroeca proxima (O.P.-Cambridge)	-	-	+	-	
ANYPHAENIDAE:					
Anyphaena accentuata (Walckenaer)	+	-	+	+	tree trunks
THOMISIDAE:					
Oxyptila trux (Blackwall)	-	-	+	-	
LYCOSIDAE:					
Lycosa pullata (Clerck)	-	+	-	-	
L. lugubris (Walckenaer)	+	+	+	+	
Tarentula pulverulenta (Clerck)	+	-	-	-	

Species	Pitfall trap sites 1	2	3	4	Other habitats
Trochosa terricola Thor.	-	+	+	+	
Pirata hygrophilus Thor.	-	+	-	+	
AGELENIDAE:					
Cryphoeca silvicola (C.L.Koch)	+	-	-	+	tree trunks
Hahnia montana (Blackwall)	-	-	+	-	
H. helveola Simon	-	-	+	-	
THERIDIIDAE:					
Theridion vittatum C.L.Koch	+	-	-	-	
T. pallens Blackwall	+	+	-	-	
Robertus lividus Blackwall	+	+	-	-	tree trunks
Theonoe minutissima (O.P.-Cambridge)	-	-	+	-	
TETRAGNATHIDAE:					
Tetragnatha extensa (L.)	-	-	-	-	woodrush in alder carr
T. montana Simon	-	-	+	-	tree trunks
T. obtusa C.L.Koch	+	-	-	-	
Pachygnatha listeri Sund.	+	-	+	-	
P. degeeri Sundevall	-	-	-	-	moss under heather
ARGIOPIDAE:					
Meta segmentata (Clerck)	-	+	-	+	
M. segmentata mengei (Blackwall)	+	+	-	-	
M. merianae (Scopoli)	+	-	-	+	
Araneus diadematus Clerck	-	-	-	-	on heather
A. umbraticus Clerck	-	-	-	-	tree trunks
A. cucurbitinus Clerck	-	-	-	-	on wooden post

TABLE 3: INCHCAILLOCH SPIDERS - Family Linyphiidae

Species	Pitfall trap sites 1	2	3	4	Other habitats
Ceratinella brevipes (Westring)	+	+	+	-	tree trunks
C. brevis (Wider)	-	-	+	-	
Walckenaera acuminata Blackwall	+	+	+	+	
Wideria cucullata (Koch)	-	+	+	-	
W. fugax (O.P.-Cambridge)	-	-	+	-	
W. polita (Simon)	-	-	+	-	
Trachynella nudipalpis (Westring)	+	+	+	-	
Cornicularia cuspidata (Blackwall)	-	-	+	-	
Dicymbium nigrum (Black.)	-	+	-	-	
D. tibiale (Blackwall)	+	+	-	-	
Gongylidium rufipes (Sundevall)	-	-	+	+	
Dismodicus elevatus (Koch)	+	-	-	-	
Hypomma cornutum (Black.)	+	-	-	-	
Gonatium rubellum (Black.)	+	+	+	+	tree trunks
Maso sundevalli (West.)	-	-	-	+	
Pocadicnemis pumila (Blackwall)	-	+	+	-	
Lophocarenum nemorale (Blackwall)	-	-	-	-	tree trunks
Cnephalocotes obscurus (Blackwall)	-	+	-	-	
Tapinocyba pallens (O.P.-Cambridge)	+	+	+	+	
Thyreosthenius parasiticus (Westring)	-	-	-	-	tree trunks

Species	Pitfall trap sites 1	2	3	4	Other habitats
Monocephalus fuscipes (Blackwall)	+	+	+	+	tree trunks
M. castaneipes (Simon)	-	+	-	+	
Jacksonella falconeri (Jackson)	+	+	-	-	
Gongylidiellum vivum (O.P.-Cambridge)	+	-	+	+	
Micrargus herbigradus (Blackwall)	+	+	+	+	
Erigonella hiemalis (Blackwall)	+	+	-	+	
Savignia frontata (Black.)	-	-	-	-	tree trunks
Diplocephalus cristatus (Blackwall)	-	-	+	-	tree trunks
D. latifrons (O.P.-Camb.)	+	+	-	+	
D. picinus (Blackwall)	+	+	-	+	
Caledonia evansi (O.P.-C.)	-	-	-	-	tree trunks
Erigone dentipalpis (Wider)	+	-	-	+	
E. atra (Blackwall)	-	-	-	+	
Leptorhoptrum robustum (Westring)	-	+	-	-	
Hilaira excisa (O.P.-C.)	-	+	-	-	
Porrhomma pygmaeum (Blackwall)	-	-	+	-	
P. pallidum Jackson	+	+	+	+	
P. montanum Jackson	-	-	+	-	
Agyneta conigera (O.P.-C.)	-	-	+	-	
A. ramosa Jackson	-	-	+	-	
Micronetta viaria (Black.)	+	+	+	+	
Maro minutus O.P.-Camb.	+	-	+	-	
Centromerus sylvaticus (Blackwall)	+	+	+	+	

Species	Pitfall trap sites 1	2	3	4	Other habitats
C. prudens (O.P.-Camb.)	-	+	-	-	
C. dilutus (O.P.-Camb.)	+	+	+	+	
Sintula cornigera (Blackwall)	+	-	+	-	
Oreonetides abnormis (Blackwall)	+	+	+	+	
O. firmus (O.P.-Cam.)	+	-	+	-	
Macrargus rufus (Wider)	-	-	+	-	
Bathyphantes dorsalis (Wider)	-	-	+	-	
B. concolor (Wider)	-	+	-	+	
B. gracilis (Blackwall)	-	+	-	-	
Drapetisca socialis (Sundevall)	-	-	-	-	tree trunks
Lepthyphantes minutus (Blackwall)	+	+	+	+	
L. alacris (Blackwall)	+	+	+	+	tree trunks
L. obscurus (Blackwall)	-	-	+	-	
L. tenuis (Blackwall)	+	+	+	+	
L. zimmermanni Bertkau	+	+	+	+	
L. mengei Kulczynski	+	-	+	-	
L. tenebricola (Wider)	+	+	+	+	
L. ericaeus (Blackwall)	-	+	-	-	
L. pallidus (O.P.-Camb.)	+	+	+	+	
L. angulatus (O.P.-Camb.)	-	-	+	-	
Helophora insignis (Blackwall)	+	+	+	+	
Linyphia triangularis (Clerck)	-	-	+	+	abundant on woodrush
L. peltata Wider	+	+	+	+	tree trunks
L. hortensis Sundevall	+	-	+	+	
Mengea scopigera (Grube)	+	-	-	-	

veola and *Hilaira excisa* showed restricted occurrence, being trapped in moderately large numbers at stations 3 and 2 respectively and absent from the other sites. Rare species taken at only one site include *Drassodes pubescens* (Site 3), *Tarentula pulverulenta* (site 1), *Theridion vittatum* (site 1), as well as *Cornicularia cuspidata* (Site 3), *Cnephalocotes obscurus* (site 2), *Diplocephalus cristatus* (Site 3) and *Leptorhoptrum robustum* (site 2). An indication of the frequency distribution of the spider species is shown in Figure 1.

Some of the rare species captured are of great interest, being rare but widespread, e.g. *Jacksonella falconeri*, *Sintula cornigera* and *Theonoe minutissima*, or even rare and restricted in distribution, e.g. *Agyneta ramosa* (known from a few English counties and a Welsh county) and *Wideria polita* and *Micaria subopaca* which have previously been recorded only from southern and eastern England. Other species taken in small numbers in the pitfall traps are more abundant in habitats other than the ground layer. Thus *Ciniflo fenestralis*, *Cryphoeca silvicola* and *Segestria senoculata* have been captured in the corrugated paper traps used to study tree trunk spiders (Curtis and Morton, 1974), while other species such as *Linyphia triangularis*, *Meta segmentata* and *Tetragnatha montana* are known to occur in great numbers in the field layer vegetation and only relatively rarely enter the ground layer. *Oxyptila trux* is a crab spider which occupies the field layer vegetation and has only once been captured in the pitfall traps.

The list of spiders and harvestmen considered here is undoubtedly only an incomplete representation of the entire island species. Several immature specimens from genera such as *Zygiella* and *Philodromus* have been captured and could not be determined to species level because of their lack of genitalia. More intensive sampling of strata other than the ground layer will probably yield additions to the species list, as also will continuance of the pitfall trapping schedule. More detailed analysis of the data obtained will be published at a later date.

Acknowledgements

I am grateful to colleagues in the Department of Biology, especially Dr. J.C. Smyth and Mr. J.D. Hamilton, for advice and useful discussions, and to Mr. E. Morton for assistance in the field. Thanks are also due to Dr. J.H. Sparling for aid in plant identification and to the Nature Conservancy in the persons

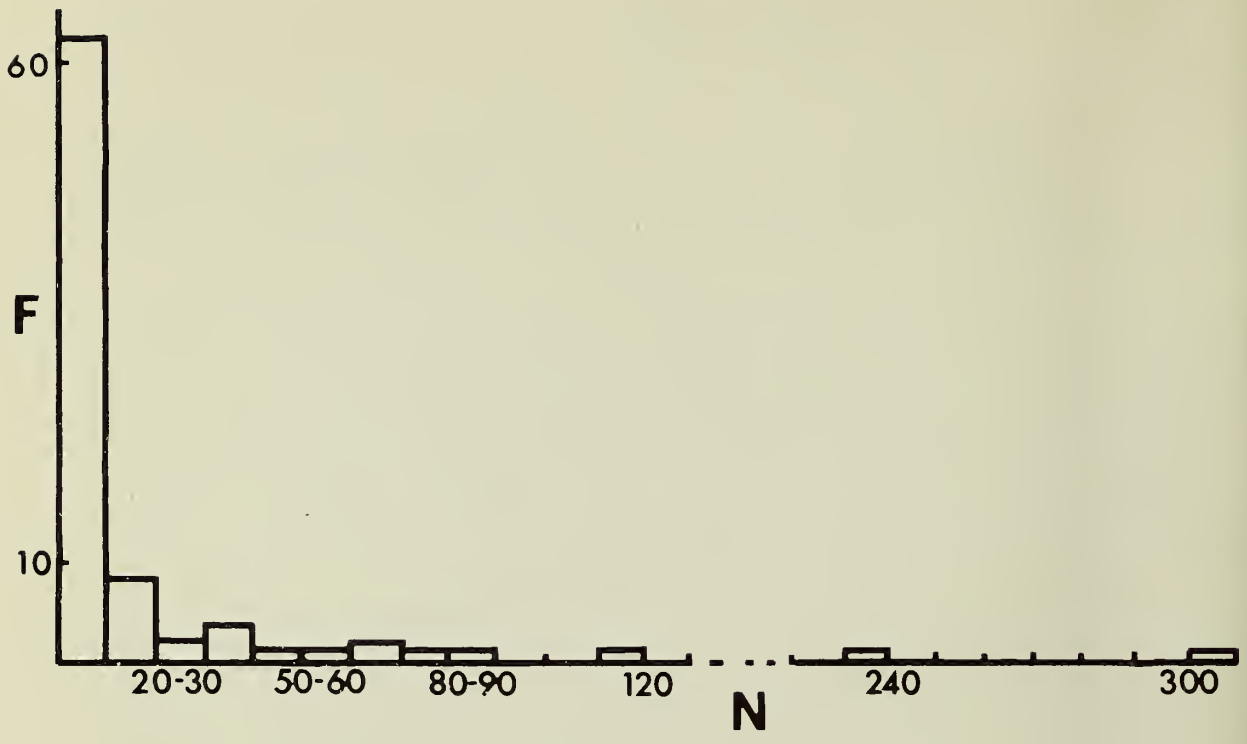

Fig. 1

Frequency distribution of spiders taken in pitfall traps on Inchcailloch, 1971-72.

The height of each column in the histogram is proportional to the frequency, F, of species, i.e. the number of species represented by N individuals, indicated along the abscissa in classes of size 10.

The highest column thus indicates 64 species represented by between one and ten individuals captured, while only one species (*Monocephalus fuscipes*) was represented by 300-310 individuals.

of Mr. E.T. Idle and Mr. C. Placido and Mr. J. Mitchell, for permission to trap on the island and various assistance.

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Dr. David J. Curtis, Department of Biology, Paisley College of Technology.

THE DISTRIBUTION OF VOLES ON THE CLYDE ISLANDS

By J.A. GIBSON
Chairman, Clyde Area Branch, Scottish Wildlife Trust

The three species of voles, the Field- or Short-tailed Vole *Microtus agrestis*, the Water-Vole *Arvicola terrestris* and the Bank-Vole *Clethrionomys glareolus* all occur widely and commonly throughout the mainland of the Clyde faunal area, both the highland and lowland parts, but their status on the Clyde islands has not always been clear. Nearly a century ago E.R. Alston (1880) drew attention to this when he wrote "I would wish to point out to Scottish field-naturalists that the distribution of Mammalian life requires revision, especially in the Islands. The Shrews, Mice and Voles especially deserve attention". Popular accounts since Alston's day have been of little assistance because such accounts seldom differentiate between Field-Vole and Bank-Vole, and because there is frequently confusion between 'water-vole' and 'water-rat'.

Since the mid-1940s I have carried out extensive trapping of small mammals on the Clyde islands, and these notes are based on my own results and on what I have been able to discover from a search of the previous literature. I have been prompted to write this because of my recent findings with regard to the Bank-Vole on the Island of Arran.

I can say at once that I have found voles to be present on all three large Clyde islands: Bute, Arran and Great Cumbrae. The results of my trapping on seventeen small Clyde islands have already been given (Gibson, 1969); their small mammal populations consist chiefly of Pygmy Shrew *Sorex minutus*, Rabbit *Oryctolagus cuniculus*, Brown Rat *Rattus norvegicus*, some bats, and occasionally the House Mouse *Mus musculus* as an accidental importation. I could find no voles on any of the small Clyde islands, the best known of which are Sanda, Davaar, Ailsa Craig, Pladda, Holy Island, Inchmarnock, Little Cumbrae and Great Sgat (Loch Fyne).

As far as I can discover, therefore, the status of the three voles on the large Clyde islands is as follows:

SHORT-TAILED VOLE *Microtus agrestis* (Linnaeus, 1761)

The Field- or Short-tailed Vole occurs commonly in all suitable areas on the three large Clyde islands of Bute, Arran and Great Cumbrae. It has always been known to be present, as far back as E.R. Alston's pioneer work of a century ago (Alston,

1880), and has been recorded by all subsequent workers.

WATER-VOLE *Arvicola terrestris* (Linnaeus, 1753)

BUTE: According to Alston (1872, 1880) and to Hugh Boyd Watt (1905) there were no Water-Voles on any of the Clyde islands. It is also interesting to note that the collector employed by G.E.H. Barrett-Hamilton, M.A.C. Hinton and W.R. Ogilvie-Grant in their survey of West Hebridean islands in 1912 recorded no Water-Voles from the Clyde islands. As I have found myself, however, the Water-Vole is not a species which readily lends itself to trapping, particularly to the methods one usually has available for other voles, so trapping results are not always a good guide, and one has to rely on continued observation over a long period of time. For this, of course, one normally has to be resident on a particular island, as was L.P.W. Renouf on the Island of Bute in 1919, and it is to Renouf, later to become Professor of Zoology at Cork University, but at that time Curator of the Bute Museum, that the credit must go for first discovering Water-Voles on any Clyde island.

Renouf found Water-Voles on Bute, but in his 1919 paper to the *Glasgow Naturalist* he said he had "very few records" and only one record of the dark form *reta*, commonly found in the highland part of Clyde. The Rev. J.M. McWilliam, who spent many years on Bute as parish minister until the early 1930s, and ultimately became Honorary Vice-President of the Buteshire Natural History Society, was an ornithologist of considerable distinction who published, amongst other things, a well-known book on the *Birds of the Island of Bute*. As well as this, however, he also collected considerable material on the distribution of Bute mammals for a companion volume to his work on Bute birds, but for various reasons this never materialised and he passed his entire notes on to me some years before he died. McWilliam also found Water-Voles on Bute, and knew them to be "reasonably common in the right places", although somewhat local in habitat. I myself have also seen a good many Water-Voles on Bute, and I quoted McWilliam's work in my 1970 paper on Bute mammals, which would have appeared under our joint names had McWilliam lived.

ARRAN: The Water-Vole appears to be entirely absent from Arran; its absence was recorded by E.R. Alston as far back as 1872, and by subsequent authors.

GREAT CUMBRAE: I have no record at all of the occurrence of the Water-Vole on Great Cumbrae. Rumours of its occurrence keep reaching me, but none of these I have been able to confirm. The Brown Rat is common on Cumbrae and I suspect that the various statements about the Water-Vole have their origin in the usual confusion between the 'water-vole' and the 'water-rat". Many

otherwise experienced people do not seem to realise how much time the Brown Rat can spend in water.

In the Annual Report of the Scottish Marine Biological Association for 1936-37 the Director, Mr. Richard Elmhirst, gave details of the winter feeding habits of Otters *Lutra lutra* on Cumbrae, and reported "From the excreta of otters the bones of Wrasses, Gadoids, Cobblers, Flatfish and Voles are recognisable". Although the Short-tailed Vole occurs commonly on Great Cumbrae it must be admitted that the species of vole most likely to be encountered by Otters would be the Water-Vole. Unfortunately I have been unable to obtain any further details about Mr. Elmhirst's research.

The situation, therefore, is not without some doubt, and accurate information is urgently required, but in the absence of any such confirmation it must be assumed in the meantime that Water-Voles do not occur on Great Cumbrae.

BANK-VOLE *Clethrionomys glareolus* (Schreber, 1780)

BUTE: The Bank-Vole is now known to be fairly common and widely distributed throughout Bute, although the first record for the island appears to have been the specimens collected in 1912 by Mr. R.W. Sheppard on behalf of G.E.H. Barrett-Hamilton and his co-workers at the British Museum (Natural History). It had not been recorded previously, either by Alston or Boyd Watt, but was well-known to Renouf and McWilliam in the 1920s and 1930s.

ARRAN: In over twenty years of live trapping of small mammals on the Island of Arran I caught many Short-tailed Voles, but no specimens of the Bank-Vole. This was more or less what I expected, for although E.R. Alston implied the possible occurence of the Bank-Vole in his 1872 Arran paper, in his later West of Scotland mammal survey of 1880 he said "It has not yet been recorded.....from any of the Islands". Hugh Boyd Watt (1905) agreed with this and no Bank-Voles were trapped on Arran by Mr. R.W. Sheppard, the collector employed by Barrett-Hamilton, Hinton and Ogilvie-Grant in the 1912 expedition to collect small mammals on some West of Scotland islands (Barrett-Hamilton and Hinton, 1913). In my 1954 survey of Clyde mammals I stated that I knew of no record from Arran, and this remained the position until quite recently.

In 1966, however, I trapped two Bank-Voles on the edge of some conifer plantations near Brodick Castle, which came as a considerable surprise, and the following year I caught four. At that time I wondered if the Bank-Vole had perhaps been overlooked in the past and implied this possibility in my paper on the mammals of Arran (Gibson, 1969), but cautiously said I "can

give no accurate assessment of its population as compared to the field-vole."

In 1970 I again set many live traps in the Brodick Castle area and caught about equal numbers of Bank-Voles and Field-Voles, which I reported, without further comment, in the supplement to my Arran mammal paper (*Trans. Buteshire Nat. Hist. Soc.*, 18: 45-47). In 1972, however, I again trapped in the area of Brodick Castle and caught plenty of Field-Voles but no Bank-Voles at all, and this trapping I repeated in 1973 with similar results, - no Bank-Voles. Moreover, at no time have I caught Bank-Voles in any other part of Arran, although I have easily trapped Field-Voles in several other suitable parts of the island.

I find this extremely puzzling, and can only presume that there has been a localised introduction of the Bank-Vole to Arran, which has not succeeded, and about which I have been given no information. I have contacted all zoologists known to me who might be likely to have knowledge of such an introduction, but without success. I shall be grateful, therefore, if anyone can supply me with any additional information about the occurrence of the Bank-Vole on Arran. In the meantime, its present status must be regarded as unknown.

GREAT CUMBRAE: The Bank-Vole seems to be entirely absent from the Great Cumbrae. No specimen appears to have been caught in 1912 by R.W. Sheppard, the collector employed by Barrett-Hamilton, Hinton and Ogilvie-Grant, and I myself have found none, although the Short-tailed Vole is common, and easily trapped, on the island.

Summary:

The Field- or Short-tailed Vole occurs commonly on all three large Clyde islands of Bute, Arran and Great Cumbrae.

The Water-Vole occurs on Bute, is certainly absent from Arran, and the position appears doubtful on Great Cumbrae.

The Bank-Vole occurs on Bute, is absent from Cumbrae, but may have been recently introduced to Arran.

To the best of my knowledge there are no voles on any of the small Clyde islands.

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Dr. J.A. Gibson, Foremount House, KILBARCHAN, Renfrewshire.

NATTERER'S BAT *Myotis nattereri* IN STIRLINGSHIRE

By CARMEN PLACIDO
Warden, Beinn Eighe Nature Reserve, Wester Ross

About 23.00 hours G.M.T. on Thursday 7th June 1973, while catching bats with the aid of a hand net near Milton of Buchanan, Drymen, Stirlingshire, I observed a bat flying low to the ground around me. This bat was larger than the specimens of Pipistrelle *Pipistrellus pipistrellus* which I had been catching earlier, and flew slowly in wide sweeps along the edge of a line of beech trees. It was caught in the first sweep of the net and, on examination, proved to be a pregnant female Natterer's Bat *Myotis nattereri*. This is the first record of the occurrence of this species in Stirlingshire (and incidentally the first fully authenticated record for the Clyde faunal area), although it was recently found a few kilometres further north in Perthshire (Placido, 1972), and is certainly the first positive indication that the species breeds in Scotland. The bat was later ringed and released. On subsequent evenings a further three females (all pregnant) were caught at the same locality.

On 12th July 1973, I investigated a report from the occupier of a large house in Balmaha, Stirlingshire - a matter of two kilometres west from the Milton of Buchanan locality - who stated that there was a colony of bats in residence within his roof. After a search I found a colony of *M. nattereri* clustered together on the inner roof timbers. A quick count - to avoid too much disturbance to the bats - revealed that there were between 100 and 150 bats. Most appeared to be females and were in an advanced state of pregnancy. In fact, slightly apart from the main colony, there were three females who were each nursing a recently born young one. The large amount of bat droppings on the floor suggested that the colony had been in residence for some considerable time.

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Mr. Carmen Placido, Anancaun Field Station, Kinlochewe, Achnasheen, Wester Ross.

NOTES ON TWO WINTER ROOSTS OF DAUBENTON'S BATS NEAR WANLOCKHEAD, DUMFRIESSHIRE

By W.S. HARVEY
Chairman, Glasgow Spelaeological Society

The existence of hibernating bats in old mines in the West of Scotland has been noted by the Glasgow Spelaeological Society at various times, and from 1968 efforts were made to collect records of sightings. By the summer of 1970 enough information had been gathered for a brief catalogue to be published in the October issue of the Society's *Newsletter*. This made particular reference to bats seen in the old mines around the villages of Wanlockhead and Leadhills, and suggested that some of these were of the species Daubenton's Bat *Myotis daubentoni*. This was subsequently confirmed by Mr. C. Placido of the Nature Conservancy, and it is now known that there are at least twelve Daubenton's Bats hibernating in two mine tunnels.

Daubenton's Bat is usually associated with woodland streams, so the existence of these roosts in an area of bare moorland, and at 1400 feet altitude, is considered to be of sufficient interest and importance to warrant this brief account of the mine roosts, and of the observations to date.

LOCALITY

Wanlockhead is situated in the north-east corner of Dumfriesshire and both it and the neighbouring village of Leadhills are isolated communities centred on a now abandoned leadmining industry, which had provided almost continuous activity from the 17th century to the 1930s. The locality is one of high moorland dominated by the Lowther Hills which rise to 2000 feet. There is virtually no arable farming and the ground is given over to sheep rearing and to grouse shooting. The moors are almost treeless, but there are stands of hardwoods in both villages and a mature plantation of firs near Leadhills. A number of hill streams flow either to the Nith or the Clyde, and old mine reservoirs provide standing water.

THE MINES

Interest in the bats centres on the old mines, which also provide for the study of other hypogean fauna, of geology, hydrology, and of mining history.

A feature of the older mine workings was the horizontal

entrances, or 'adits', driven into the hillsides and from which passageways, or 'levels', gave access to the ore veins and drained off the water. At one time there must have been upwards of thirty such adits in the area but few remain open today, and of these many are either difficult of access or in a dangerous condition. Safety is always of prime importance in activities underground and has been the main criterion of the extent of this investigation.

CLIMATE

The outdoor weather in the area is variable and often severe. Rainfall is high, 60-70 inches per annum, the moors are swept with strong winds, and heavy winter snows, and temperatures as low as -17°C., are not unusual. In the mine levels, however, the climate is a very stable one. Records taken by the Society show that the environment temperature deep inside the mines is constant at about 7.5°C, only changing as the adit is approached. There is no strong flow of air, and the constant presence of water keeps the atmosphere charged with moisture.

DISTRIBUTION OF THE BATS

Searches have found a total of twelve Daubenton's Bats, and one Long-eared Bat, hibernating in two of the old mine works, here referred to as Glengonnarhead and Glenclach. The latter is wholly accessible and has been carefully examined. Eight of the bats were found there, and while the possibility of others being overlooked is very real it is not thought that more than one or two have been missed. Not all the passageways in the Glengonnarhead mine have been examined, or indeed can be examined with safety. Only four bats have been noted in it, but it is likely that more are in the deeper levels. The tunnels which were specially driven to drain the mines give entry to the most extensive workings but are now deeply flooded and difficult of access. In September 1971 a party trying to find a route into the Straitsteps mine from a drainage tunnel in Wanlockhead saw two bats flying about, so it seems likely that drainage tunnels may give access to roosts where the bats are unlikely to be greatly disturbed.

The whereabouts of the summer roosts are not known. Bats have not been seen in either the Glengonnarhead or Glenclach levels during the summer, but fresh droppings have been noted in the latter in August. Individual bats have also been seen in August in an old tramway tunnel near Leadhills.

HABITAT

The mine passageways are in a silurian greywacke and the

rock surfaces against which the bats rest are damp and often slightly muddy. Very wet or very muddy surfaces seem to be avoided. The passageways are normally 1.5m to 2m high, and 0.75m to 1.25m wide, and no bats were seen roosting less than about 1m above the floor.

The passageways also contain: hibernating Herald Moths *Scoliopteryx libatrix*, usually near the adits; the moor fly *Leria serrata*, and various small fungi. The presence of other hypogean fauna, *gammaridae*, *collembola*, etc is suspected for they have been found in mines elsewhere, but none has yet been collected from the Wanlockhead area.

OBSERVATIONS

The roosting bats are very difficult to see in the dark passageways. When lying against the rock their colouring is very similar to the muddy greywacke, and if they are lodged in a crevice, one has to look directly into it to see the animal. It was found that the most satisfactory search method was to divide the passageways into arbitrary sections, and to examine these in turn in both directions. Hand torches were used to augment the usual head-lamps. Distances have been calculated from paced measurements, and temperatures were taken with a small thermometer to 1°C.

THE GLENGONNARHEAD ROOST

The Glengonnarhead adit is below the road that runs between Wanlockhead and Leadhills, and was driven to work ore veins at the boundaries of the mining grounds. It is not known when the adit was opened, but it is thought not to have been more than 100 years ago. The workings were probably extensive at one time but now consist of a straight level running about 150m in a westerly direction, with a similar length of branch passageway to the south-west at the end running into collapsed 'stopes' along the vein from where the lead ore was mined. There are a number of other branch passages off the entry level, and two of these connect by shafts with deeper workings. Bats have been seen in these lower workings and flying up out of the connecting shafts. There is no flowing water in the upper levels, but flood water collects in various places to a depth of a few inches.

The first firm note of a bat sighting in the mine was a Daubenton's Bat seen tightly lodged in a crevice in the roof of a short passageway about 10m below the upper levels. This was in April 1968, and the animal was seen quite by chance. It was about 100m from the adit, and did not stir even when closely examined with a strong light. Although there have been further

visits, the bat has not been seen again in this passageway. In April 1970, however, a bat was found about 20m from the adit in the main level. It was hanging against a piece of rock which faced into the mine. This site was near enough to the adit to be influenced by the outside temperature, and a reading near the bat gave 4°C. The animal was sharing the rock with a Herald Moth, and both were covered with drops of moisture. The bat was still there a week later, it did not object to light, but stirred slightly when touched.

On 24th January 1971 the whole of the upper levels were carefully examined and four Daubenton's Bats were seen. Two were in the end branch passageway, the farther one being about 220m from the adit. Both were hanging against the rocks. The other two bats were in side passages, and about 50m and 100m from the entrance. One of them was hanging in the usual way, but the other was lying flat on a ledge. None of the other bats was in such a position, and the little creature looked like some strange bird. All of them seemed torpid.

THE GLENCLACH ROOST

Glenclach is south-west of Wanlockhead and about 1/¾ miles from Glengonnarhead. The level is part of a water system begun in 1763. It runs ESE from Glenclach and is about 300m long, with neither deeper working nor branch passageways. A small stream fed by underground springs flows in it.

There are no records of any bats being seen in the tunnel prior to April 1970, when a Daubenton's Bat was found about 18m from the adit, and against a rock which faced into the level. Like the Glengonnarhead bat, seen the previous day, it was covered with moisture. The whole tunnel was examined the following weekend. The moisture-covered bat had gone, but one was found lodged in a crevice about 55m inside, and with an air temperature of 6.5°C. A search of the tunnel in August found no bats, though this cannot be taken as conclusive.

On 24th October 1970 the tunnel was carefully examined by the writer and Mr. C. Placido, and seven bats were seen. A physical examination of one of them confirmed that they were indeed Daubenton's. Six of these were found and one Long-eared Bat. Three of the Daubenton's were in the western, outer, part of the tunnel, and three in the inner portion. Two of the latter were flying about. No note was made of the various positions of the bats seen, but in general they seemed to have been within the pattern subsequently noted.

A further search was made on 23rd January 1971, and the positions of each bat noted. Being the middle of winter, it

was thought that all would be torpid, but as will be seen this did not prove to be the case. It will be seen in the following table that the bats are in two groups, one in each part of the tunnel, and the groups about 120m apart. Eight Daubenton's were noted on this occasion, but the grouping seemed similar to those seen previously. One can only speculate as to whether this grouping was deliberate or otherwise, and on the restlessness of the inner group of bats.

Positions of Daubenton's Bats in Glenclach Tunnel

Distance from Adit	Attitude	Position	Temp.
20m	Hanging against rock.	North wall.	5°C.
48m	In crevice	South wall.	--
50m	Hanging against rock.	Roof.	--
65m	do.	North wall.	--
100m	do.	South wall.	6.5°C.
220m	do.	do.	--
235m	do.	Roof.	--
250m	do.	do.	7.5°C.

As before, the second group of bats, ie. those in the inner part of the tunnel, seemed very restless, stirring even when a light was shone on them. Examination was kept as brief as possible, but even so one flew on to an iron beam that is placed across the passageway. Fortunately it was possible to pass it, and it was then seen to fly off towards the end of the tunnel.

When disturbed like this, the bats fly up and down the beam of light from one's head-lamp, wheeling abruptly when close to one's face. If the light is directed away from them, however, they soon settle down. Such disturbance of hibernating bats is to be avoided for it forces the animal to use up its reserves of fat, and there is also the danger of driving it out of the mine altogether.

On this last visit, some Herald Moths which previously had been seen near the adit had gone. It may be that they were eaten by the Long-eared Bat, which has been known to take moths etc off foliage. The Glenclach tunnel also contains a large hibernating population of the moor fly *Leria serrata*. Their presence with the bats poses the question as to whether they

are eaten in the mine by the latter.

The flies are also of interest in themselves. They are often affected by a white fungus which may be similar to that identified by Cubbin on flies in the Springswood Level, Wharfedale, as a *Moniliaceae*. (B. Cubbin, *Northern Cavern & Mine Research Memoirs for* 1969, p. 85).

The flies and their possible relation with the bats are the object of further study and it is hoped to be able to publish the results in due course.

CONSERVATION

No certain information is available of the present state of the bat population in the area, though it is claimed that fewer bats are now seen about the villages in summer.

The number of open adits available as roosts is undoubtedly decreasing. One, near Leadhills and known to contain a colony of bats, collapsed in the winter of 1968, presumably trapping the animals roosting in the levels. Another adit is threatened at present by the slumping of the ground on the face of the hillside above it. It is in too dangerous a condition to examine, so it is not known if there are any bats inside.

It is apparent that not all the bats in a roost are torpid all the time. So some must be disturbed by visitors, even when they are bent on serious studies. For this reason, our examinations of the present animals have been as brief as possible.

The report of bats found in various old mines in the West of Scotland, published in the Glasgow Spelaeological Society's *Newsletter* for October 1970, suggested that disturbance had driven bats from some local mines, and the ill effects of disturbance on bats in mines etc in Southern England has been dealt with by R.E. Stebbings (Bats Under Stress. *Studies in Spelaeology,* part 4, Dec. 1968 p. 168).

The Glengonnarhead adit, being near a road, is certainly visited occasionally by parties of one sort or another, but, if disturbed, the bats in it can at least retreat to lower and less accessible levels. The bats in the Glenclach tunnel on the other hand are more vulnerable for they have nowhere to retreat to, and there is always the chance that they might fly out of the tunnel. This could be disastrous in severe weather.

It could be said that these are precious habits for animals which, at the best, now seem few in numbers. The tunnel at Aberfoyle described by Carmen Placido in the previous issue (*Western Nat.*, 1: 59-62, 1972) has now been made a Reserve by the Scottish Wildlife Trust, and the bats in it are thus protec-

ted. While it is not suggested that all old mines and tunnels should be dealt with in this way, there is a case for encouraging landowners to put gates on those most likely to offer a refuge for bats in the locality concerned.

Mr. William S. Harvey, 23 Orleans Avenue, Glasgow, G.14.

THE FAUNA OF SOME ROCKY SHORES IN THE CLYDE ESTUARY

By J.C. SMYTH
Department of Biology, Paisley College of Technology

During recent years public concern has rapidly grown about the effects which pollution may be having on the condition of our sea-shores. The effects of oil have perhaps attracted the greatest public attention but the more widespread influence of untreated sewage and diverse industrial effluents is also causing concern. Many field naturalists must therefore be surprised to discover how little is yet known of the effects of pollutants on the plants and animals of the sea-shore. A rapid growth of research effort in this direction is only beginning to supply information of the changes which pollution may cause to the natural history of shores, estuaries and coastal waters.

In fresh waters, where the problems of pollution have been recognised for much longer, such effects are well known. Changes in the composition of flora and fauna and the identification of certain "indicator" species enable freshwater biologists to use these as a measure of the degree of pollution - the biotic index. The advantage of this index as a measure, over chemical and physical data, is that it represents a response to the total pollution of the system through a period of time, during which variations in the quantity and nature of contaminants may have occurred too irregularly for accurate chemical recording to be practicable. While the effects of the same pollutants on marine organisms are similar, attempts to measure marine pollution by such changes have been much less successful. The much greater variety both of marine organisms and of the factors which determine their distribution make it exceedingly difficult to separate changes due to pollutants from those due to "natural" causes. It is very difficult even to establish the state of presumed normality against which changes can be assessed, either in terms of normal distribution of organisms or of the normal fluctuations which they exhibit. Thus a rough but useful tool which biologists can provide to those concerned with freshwater pollution is denied to those dealing with the pollution of the sea.

Some years ago, during a survey of the natural history of the City of Edinburgh seashore, I noticed that in one area the animals living on rocks seemed to exhibit a gradient of distribution along the shore which could be related to the dispersal of effluent from a large sewer carrying mainly untreated domestic sewage (Smyth, 1968). The area, to the west of Granton

Harbour, was particularly badly affected since tidal movement tended to sweep the effluent onto the shore rather than carry it away. In general the effects on the fauna were those commonly found in all circumstances where a community of organisms is subjected to stress: the variety of species was reduced, by two thirds, as compared with similar situations less affected by sewage, but a small number of animals well adapted to the altered conditions were present in unusually large numbers.

In a recent review of the effects of sewage pollution in the sea, O'Sullivan (1971) discussed these effects more fully and supported Tulkki's arrangement (1968) of animals into three groups according to their response to polluted conditions. These are:

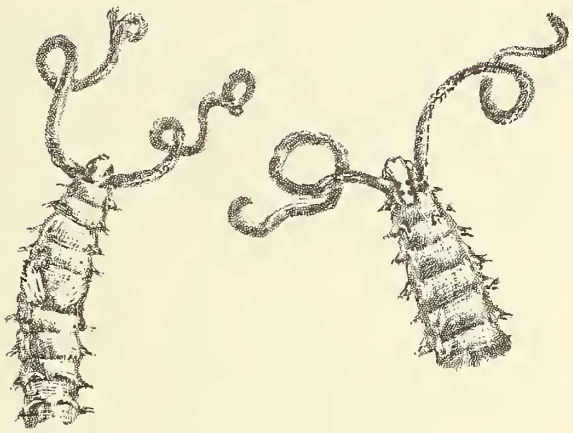
(1) Regressive species, which disappear or retreat from the polluted regions. In my survey these included such familiar shore animals as the limpet *Patella vulgata*, the dog winkle *Thais lapillus*, the keelworm *Pomatoceros triqueter*, the hermit crab *Pagurus bernhardus*, the sea anemone *Actinia equina* and others.

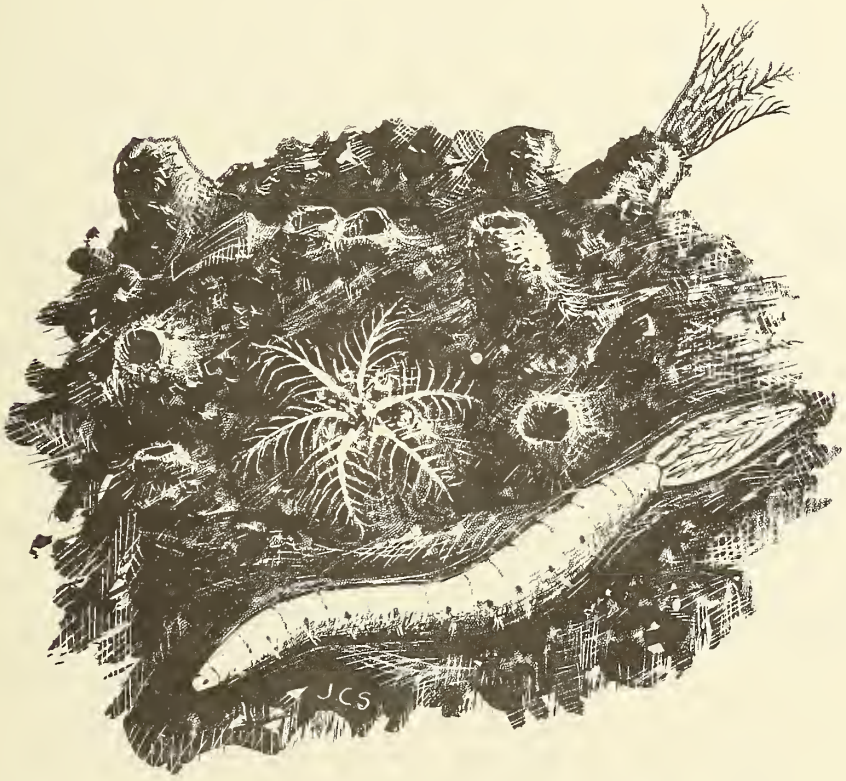
(11) Transgressive species, which are more numerous in polluted areas than in similar habitats less affected by it. The most conspicuous of these were two species of tube-worms, *Fabricia sabella* and *Polydora ciliata* which, although individually relatively small, formed dense mats of muddy tubes, usually associated with small algae, and reaching as much as an inch thick over the surfaces of rocks.

(111) Indifferent species, apparently unaffected by pollution. The most noticeable of these were the mussel *Mytilus edulis*, the periwinkle *Littorina littorea* and the barnacle *Balanus balanoides*.

It is noteworthy that most of the animals of the second and third groups are dependent for their food on organic detritus or its associated bacteria, but also capable - as the mussel is, for example - of withstanding the smothering effects of too much of it.

Observations on other rocky sea-shores similarly affected by pollution have suggested that the variation of the fauna recorded at Granton may be repeated elsewhere. Among those which have been examined are the rocky shores of the Clyde estuary, which extend westwards from Port Glasgow to the Firth beyond Cloch Point on the south side, interspersed by shipyards, docks and harbour-works; on the north side boulders and rocky outcrops especially on the upper shore become more numerous as one travels west to Ardmore Point, and again at Helensburgh.





Above: Anterior ends of (left) *Polydora ciliata* and (right) *Pygospio elegans*; x 7.

Below: Surface of mat formed by *Fabricia sabella*, including one worm migrating over the surface, rear end first, a common habit; x 25.

Table 1: Occurrence of certain rocky shore animals

	GOUROCK (Bay)	GREENOCK (Esplanade)	NEWARK CASTLE	PORT GLASGOW (east)	ERSKINE
Halichondria panicea	2	2	-	-	-
Actinia equina	3	1	-	-	-
Tubificids	2	3	3	2	4
Mat-forming worms	2	3	4	4	-
Pomatoceros triqueter	2	1	-	-	-
Balanus balanoides	4	4	4	4	-
Patella vulgata	3	3	-	-	-
Littorina littorea	4	4	3	3	-
Thais lapillus	3	3	-	-	-
Buccinum undatum	2	2	-	-	-
Mytilus edulis	4	4	4	3	-

The figures represent scores as follows:

4 - Abundant; dominant in suitable situations;
3 - Common; visible in suitable places at a glance;
2 - Scattered; some searching needed;
1 - Occasional; only one or two seen, possibly casual.

A simple survey method was used, the same as that used in Edinburgh. It was restricted to a number of common and prominent species, typical of the rocky shores in the area, which could generally be found without much searching and which, with the exception of the mat-forming worms, could be identified at a glance. Their abundance was roughly indicated by placing them on a four-point scale. The results of this survey for a number of species are contained in the accompanying table (Table 1), along with a definition of the scale. It refers to numerous observations from 1968 to 1973.

Mat formations are one of the most notable features of this shore. Travelling from east to west, they are first conspicuous at low tide on the stakes of the timber ponds east of Port Glasgow and are a dominant if variable feature as far as the west of Greenock. On this stretch of shore the mat consists largely of the tubes of *Fabricia sabella*, with a few *Pygospio elegans* in places. Associated organisms include the sea-slater *Jaera albifrons*, harpacticoid copepods, tubificid worms and turbellarian worms, with colonial ciliate protozoans sometimes in evidence.

West of Princes Pier there is a notable increase in the variety of the shore fauna generally, and the mat formation becomes more restricted. At about the same place *Polydora ciliata* becomes conspicuous as a mat-builder and is dominant in some patches at Gourock, at least on the lower shore. *Fabricia sabella* again occurs in large numbers west of Gourock in an algal turf, to which it contributes a large content of silt and mud. A conspicuous member of the mat fauna here is the little crustacean *Tanais cavolini*.

On the north side of the estuary rocky shores are fewer. West of Cardross, at Ardmore Point, and also at Kilcreggan the fauna includes the common species that might be expected in such situations. At Helensburgh irregularities of distribution of some animals might be related to the level of pollution, and some patches of mat occur in which both *Fabricia sabella* and *Pygospio elegans* are numerous, along with several associated species.

It is clearly difficult to separate the effects on animal distribution of the various factors which might be involved here, particularly salinity and water movements. There will also be a relationship between some, at least, of the distributions recorded and those of mud-flat animals and of algae, both of which are subjects of current research in this Department. There is, however, a marked resemblance to faunal distribution on the Granton shore, and a correspondence between the distribution of rocky shore animals and the levels of pollution defined by other criteria, as for example in the map accompanying the Clyde River Purification Board's 13th Annual Report (1968). In terms of

rocky shore animals one might distinguish three levels of pollution to compare with the relatively clean shore conditions of the Firth west of Gourock:

(1) Grossly polluted conditions, as at Erskine, where the fauna is reduced to tubificids;

(11) Heavily polluted conditions, as in the region of Port Glasgow to Greenock, with a much reduced fauna dominated by mat-forming worms;

(111) Moderately polluted conditions, as in the region from Greenock esplanade to Gourock, and at Helensburgh, where the fauna is more varied but in which mat-forming worms are still a prominent component.

Such relationships can only be put forward tentatively until more is known of the factors which control the distribution of individual species. Shore communities cannot tell us much about the state of pollution of the main body of water of which they are on the edge. On the other hand their accessibility may render them on occasion a useful pointer. It is likely that the composition of rocky shore faunas may be more directly related to water conditions than that of the infauna of sedimentary shores whose environment is more complex.

Whatever value observations of this kind may ultimately have for the assessment of pollution in coastal waters, it should not be forgotten that the sea-shore itself, as indicated earlier, has an importance of its own. It is indeed a public asset of growing importance, for recreational and other needs, the amenity of which requires more and more surveillance. This must in turn be based on a better knowledge than at present exists of such useful indicators as the responses of both plants and animals to pollutants.

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Dr. J.C. Smyth, Glenpark, Johnstone, Renfrewshire.

A PRELIMINARY SURVEY OF THE INTERTIDAL BENTHIC ALGAE OF THE CLYDE ESTUARY

By MARTIN WILKINSON
Department of Biology, Paisley College of Technology

Introduction

In recent years there has been an intensification of interest in the ecology of estuaries due, in part, to the need to understand the effects of the many and varied effluents on the ecosystems of those estuaries which have large conurbations on their shores. One such estuary is that of the River Clyde on the west coast of Scotland.

While the high level of productivity of some estuaries has been said to be due to the large input of imported material rather than to primary production, by some authors such as Darnell (1971), there is remarkably little information available in the literature concerning the plant life in estuaries.

This paper reports a preliminary survey of one plant component in the ecosystem of the Clyde estuary, namely the benthic intertidal algae, which it is hoped will provide the background information for a more detailed study of the factors limiting benthic algal distributions in the estuary. This is the first study of algae along the whole length of the estuary, the only previous records being due to Hopkirk (1813) and relating only to Helensburgh.

Area

The saline waters where the River Clyde meets the sea can be divided into two well-marked areas (Fig. 1). These are:

1. The Firth of Clyde
2. The Clyde estuary

The firth is the area seaward roughly of Greenock/Helensburgh which does not undergo marked salinity changes and has a truly marine fauna and flora. This has been the subject of extensive floristic and faunistic investigations.

The estuary, the area concerned in the present survey, is, by contrast, characterised by daily fluctuations in salinity, relatively shallow waters, relatively high suspended silt load and a much less diverse fauna and flora than the firth.

Within the estuary two zones can be recognised on the basis of the physical features of the shores and of water quality

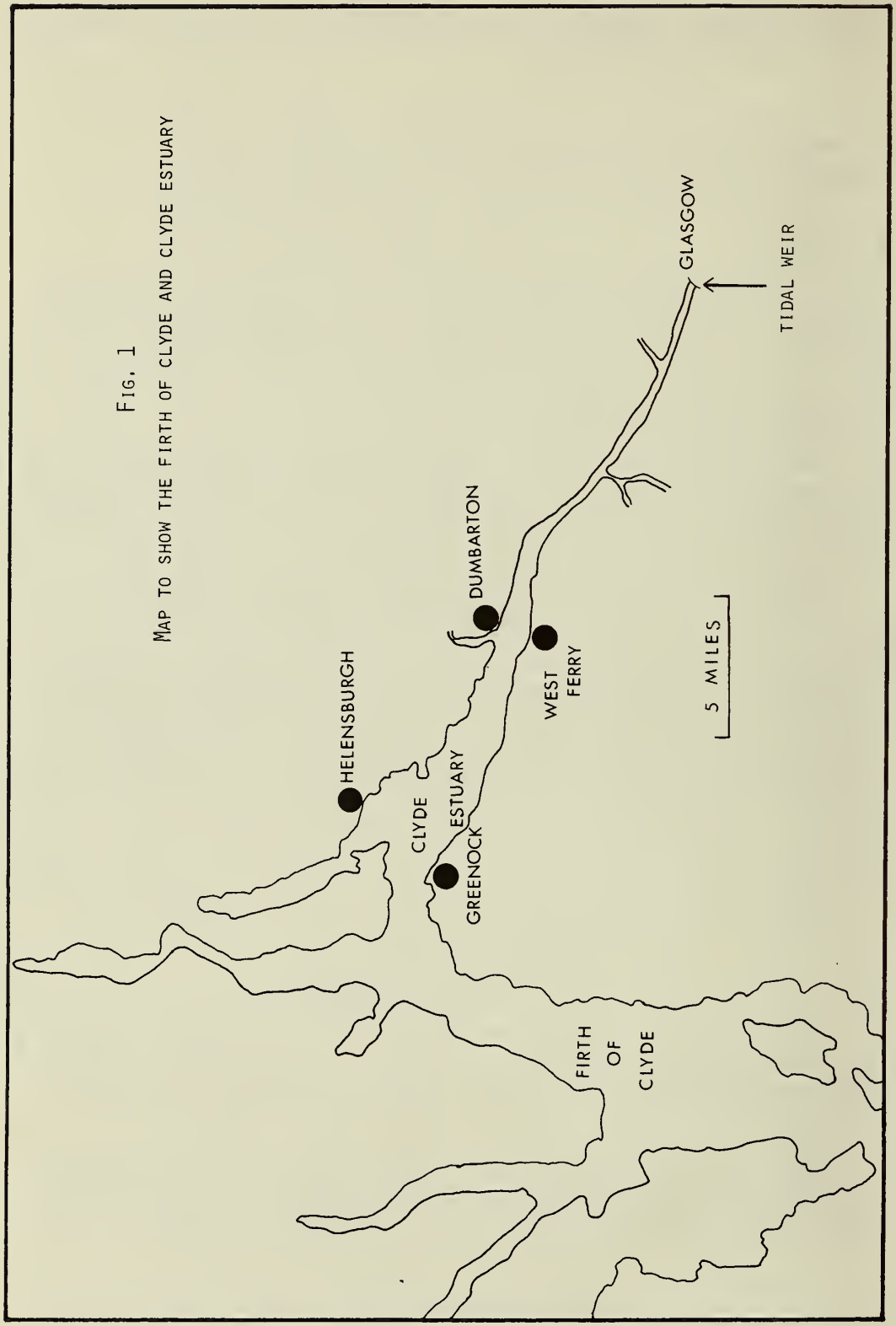

FIG. 1
MAP TO SHOW THE FIRTH OF CLYDE AND CLYDE ESTUARY

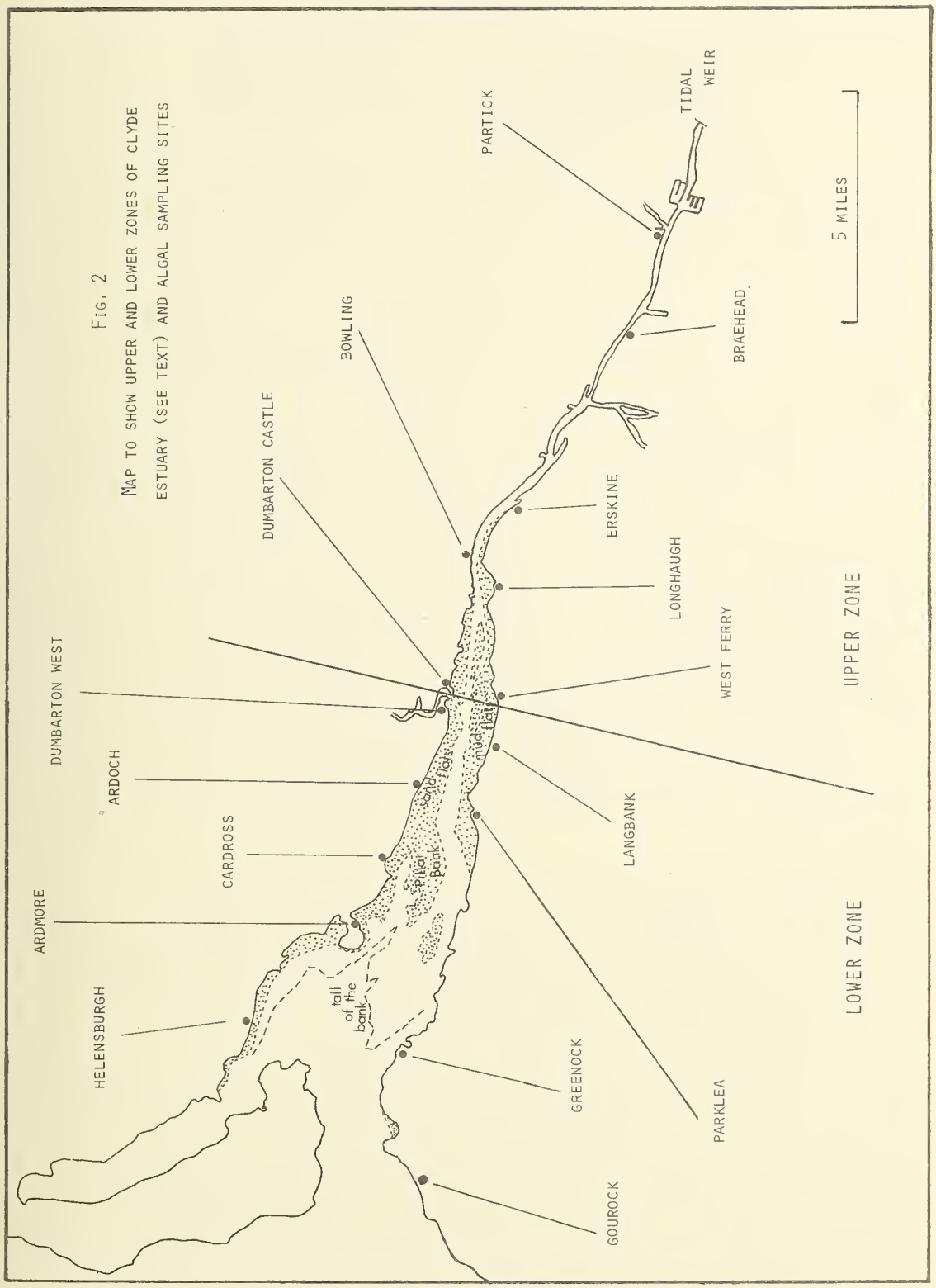

FIG. 2
MAP TO SHOW UPPER AND LOWER ZONES OF CLYDE ESTUARY (SEE TEXT) AND ALGAL SAMPLING SITES

TABLE 1

Numbers of algae of each class found at various sites in the Clyde estuary during July and August 1972.

	Chlorophyta	Phaeophyta	Rhodophyta	Cyanophyta	Bacillariophyceae	Xanthophyceae	Total
Gourock	13	9	10	2	-	-	34
Greenock	8	4	8	2	-	-	22
Helensburgh	7	9	6	2	-	-	24
Ardmore	8	6	7	2	-	-	23
Cardross	9	8	4	-	-	-	21
Parklea	9	6	3	2	1	-	21
Ardoch	11	4	4	-	-	-	19
Langbank	8	5	3	2	1	-	19
Dumbarton West	10	3	1	2	1	-	17
Dumbarton Castle	6	2	-	2	1	-	11
West Ferry	6	3	-	1	1	-	11
Longhaugh	5	1	-	-	-	1	7
Bowling	7	-	-	2	1	1	11
Erskine	7	2	-	-	1	1	11
Braehead	7	-	-	-	1	1	9
Partick	7	-	-	2	1	1	11
Tidal Weir	3	-	-	1	-	1	5

(Fig. 2). The lower zone roughly downstream of a line from West Ferry to Dumbarton Castle is the wider zone with expanses of sandflats and mudflats exposed at low tide. The water in this zone does not usually become deoxygenated, even in the summer months, and invertebrate animals are present on the shores. The benthic algae in this zone are found on the river wall at a few sites, but mainly on the rocks which are scattered about the surface of the mud and sand and also on the wooden pilings which are the remains of timber ponds at a number of sites. The upper zone of the estuary lies upstream roughly of a line from West Ferry to Dumbarton Castle and extends to the limit of tidal penetration at the tidal weir, at Glasgow Green. This zone regularly undergoes partial or complete deoxygenation, at least in the summer months (Mackay, *pers. comm.*). Except at the outermost part the estuary in the uppermost zone is relatively narrow with steep walls. No shelled molluscs have been found in this zone. A few burrowing invertebrates e.g. *Corophium volutator*, have been found at the outermost end, but apart from these the animal life of the zone is apparently restricted to tubificid worms characteristic of oxygen-poor conditions.

Superimposed on these two zones there is a gradation in conditions from the tidal weir down to Greenock so that, for example, the average salinity is lower at the weir than further downstream (C.R.P.B., 1963). However the actual figures for any parameter such as salinity vary widely at any one point in the estuary, so that correlation of algal distributions with physical and chemical factors would be difficult. Nonetheless it is important that this correlation should be made if we are to understand the functioning of estuarine ecosystems and this work represents the first stage in such a process.

Algae

Collections of the algae attached to the rocks, pilings and walls were made in July and August 1972 at a number of points in the estuary as shown in Fig. 2. The large number of species of benthic diatoms found at certain sites were excluded from the survey except for the filamentous species, *Melosira nummuloides*, which could not be ignored as it was such a dominant component of the flora in the upper zone. The total of species found, given by class, is indicated in Table 1. Table 2 gives a full systematic list. As this was merely a preliminary survey identifications were not made to species level in a few difficult genera.

As would be expected in an estuary red algae were restricted to the outer end while brown algae penetrated slightly further upstream and green algae were found throughout the whole length. In the more brackish parts blue-green algae were found in what subjectively appeared to be greater quantity and mats of the

TABLE 2 List of species of intertidal benthic algae collected at various sites in the Clyde estuary during July and August 1972.

(Key to zones: F = Firth; L = Lower estuary; U = Upper estuary
S = South side; N = North side).

Estuary zone	FS	LS	LN	LN	LN	LS	LN	LS	LN	UN	US	US	UN	US	US	UN	UN
Site	Gourock	Greenock	Helensburgh	Ardmore	Cardross	Parklea	Ardoch	Langbank	Dumbarton West	Dumbarton Castle	West Ferry	Longhaugh	Bowling	Erskine	Braehead	Partick	Tidal Weir
Miles downstream of tidal weir	25½	23	21	19½	17	16½	16	14¾	14½	14	13½	11½	10¾	9½	4½	2¼	0
CHLOROPHYTA																	
Acrosiphonia arcta (Dillw.) J.Ag.	X																
Blidingia marginata (J.Ag.) P.Dang.					X	X	X	X	X	X		X	X	X	X	X	X
Blidingia minima (Nag.ex Kütz.) Kylin					X	X	X	X	X	X		X	X	X		X	X
Chaetomorpha capillaris (Kütz.) Brøg.	X	X			X												
Cladophora albida (Huds.) Kütz.	X			X													
C. rupestris (L.) Kütz.	X	X					X										
C. sericea (Huds.) Kütz.		X	X	X	X	X	X	X	X		X						
Enteromorpha intestinalis (L.) Link	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
E. linza (L.) J.Ag.	X			X	X	X	X										
E. prolifera (O.F.Müll.) J.Ag.	X			X	X	X	X				X			X			
E. ramulosa (Sm.) Hook			X														
E. torta (Mert. in Jurg.) Reinb.															X		
Entocladia perforans (Huber) Levr.	X	X	X	X			X										

Site	Gourock	Greenock	Helensburgh	Ardmore	Cardross	Parklea	Ardoch	Langbank	Dumbarton West	Dumbarton Castle	West Ferry	Longhaugh	Bowling	Erskine	Braehead	Partick	Tidal Weir
Epicladia flustrae Reinke		X		X													
Eugomontia sacculata Kornm.			X		X	X		X									
Percursaria percursa (C.Ag.) Rosenv.	X																
Prasiola stipitata Suhr in Jessen	X						X		X		X						
Rosenvingiella polyrhiza (Rosenv.)Silva															X	X	
Rhizoclonium riparium (Roth) Harv.					X				X	X		X	X	X	X	X	
Ulothrix spp.	X	X	X			X	X	X	X	X	X	X	X	X	X	X	
Urospora sp.									X				X				
Monostroma oxyspermum (Kütz.) Doty							X	X	X	X			X	X	X	X	
Shell-boring *Codiolum*-phases	X	X	X	X		X		X	X		X						
PHAEOPHYTA																	
Ascophyllum nodosum (L.) LeJol.	X		X	X	X	X	X	X									
Chorda filum (L.) Stackh.			X		X			X									
Ectocarpus sp.		X												X			
Fucus ceranoides L.								X	X	X	X	X		X			
F. serratus L.	X		X	X	X	X	X										
F. spiralis L.	X	X	X		X	X	X	X			X						
F. vesiculosus L.	X			X	X	X	X	X	X		X						

Site	Gourock	Greenock	Helensburgh	Ardmore	Cardross	Parklea	Ardoch	Langbank	Dumbarton West	Dumbarton Castle	West Ferry	Longhaugh	Bowling	Erskine	Braehead	Partick	Tidal Weir
Laminaria digitata (Huds.) Lamour.	X	X	X														
L. saccharina (L.) Lamour.	X		X	X													
Petalonia fascia (O.F. Müll.) Kuntze				X	X	X											
Laminariocolax tomentosoides (Farl.) Kylin			X														
Pelvetia canaliculata (L.) Dcne. et Thur.	X																
Pilayella littoralis (L.) Kjellm.	X		X	X	X	X											
Ralfsia sp.		X	X		X				X								
Scytosiphon lomentaria (Lyngb.) Link	X																
RHODOPHYTA																	
Acrochaetium sp.		X	X	X													
Bangia fuscopurpurea (Dillw.) Lyngb.		X								X							
Callithamnion sp.	X	X			X												
Ceramium shuttleworthianum (Kutz.) Silva	X	X															
Ceramium rubrum (Huds.) C.Ag.	X																
Ceramium sp.			X														
Chondrus crispus Stackh.		X		X		X	X										
Shell-boring *Conchocelis*-phases	X							X									
Dumontia incrassata (O.F.Müll.) Lamour.																	

Site	Gourock	Greenock	Helensburgh	Ardmore	Cardross	Parklea	Ardoch	Langbank	Dumbarton West	Dumbarton Castle	West Ferry	Longhaugh	Bowling	Erskine	Braehead	Partick	Tidal Weir
Erythrotrichia carnea (Dillw.) J.Ag.				X													
Gigartina stellata (Stackh.) Batt.	X	X	X		X		X										
Hildenbrandia sp.	X	X	X	X	X	X		X									
Polysiphonia lanosa (L.) Tandy	X																
Polysiphonia sp.	X		X	X													
Porphyra leucosticta Thur. in Le Jol.				X					X								
P. umbilicalis (L.) J.Ag.	X	X	X	X	X	X	X	X									
Rhodochorton floridulum (Dillw.) Näg.							X										
Rhodymenia palmata (L.) Grev.	X		X														
CYANOPHYTA																	
Entophysalis deusta (Menegh.) Dr. et D.	X	X	X	X		X		X	X		X						
Lyngbya sp.									X	X			X			X	
Oscillatoria sp.										X			X			X	X
Plectonema terebrans (Born. et Flah.) Gom.	X	X	X	X		X		X									
CHRYSOPHYTA-BACILLARIOPHYCEAE																	
Melosira nummuloides (Dillw.) C.Ag.						X		X	X	X	X		X	X	X	X	
CHRYSOPHYTA-XANTHOPHYCEAE																	
Vaucheria sp.													X	X	X	X	X

Xanthophyceae, *Vaucheria sp.*, covered large areas of the upper shore.

Two unexpected points emerged from the survey. Firstly it was found that there was a correlation between the two zones of the estuary and algal class and species number. Red algae were found on each shore in the lower zone but not found on any shores in the upper zone. Shores in the lower zone had about 20 species present while shores in the upper zone had 11 species or less. Secondly, in the upper zone the dominant alga on the lower shore was the filamentous diatom, *Melosira nummuloides*, forming brown strata which completely covered the rocks at many points.

Discussion

It appears that two types of shore can be recognised in the estuary:

1. in the lower zone, shores dominated by fucoids with about 20 species of benthic algae and also a range of invertebrates present.

2. in the upper zone, shores dominated by green algae and *Melosira nummuloides* with 11 species or less present, and no obvious invertebrate fauna except tubificids.

The gradual diminution of animal and plant species numbers going upstream can presumably be explained partly in terms of the salinity tolerance of the organisms. It would appear that other factors must be invoked to explain the sharp floral delimitation between the two zones of the estuary. This difference could not be due to differences in substrate type which was predominant in the zone, as some sites were examined where all types of substrate were adjacent and no difference was found in the species present on the different types. Dissolved oxygen levels in the water would not be expected at first sight to be a major factor influencing algae distributions. However this factor will affect the presence or absence of animals which graze on the algae and experiments (which will form the subject of a separate paper) suggest that the seaward limit of dominance (but not of mere presence) of *Melosira nummuloides* may be set by the upstream limit of grazing littorinids which in turn may be set by the factors of dissolved oxygen or salinity or by both. The correlation of algal distributions with parameters of the environment will require more detailed information on the variations in the environmental factors and also information on the seasonal changes in the vegetation.

Acknowledgements

Thanks are due to Drs. E.M. Burrows and T.A. Norton for advice on identification of specimens and to Mrs. Judy Reeves for redrawing the maps.

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Dr. Martin Wilkinson, Department of Biology, Paisley College of Technology, High Street, Paisley.

RECORD TROUT IN UPPER CLYDE

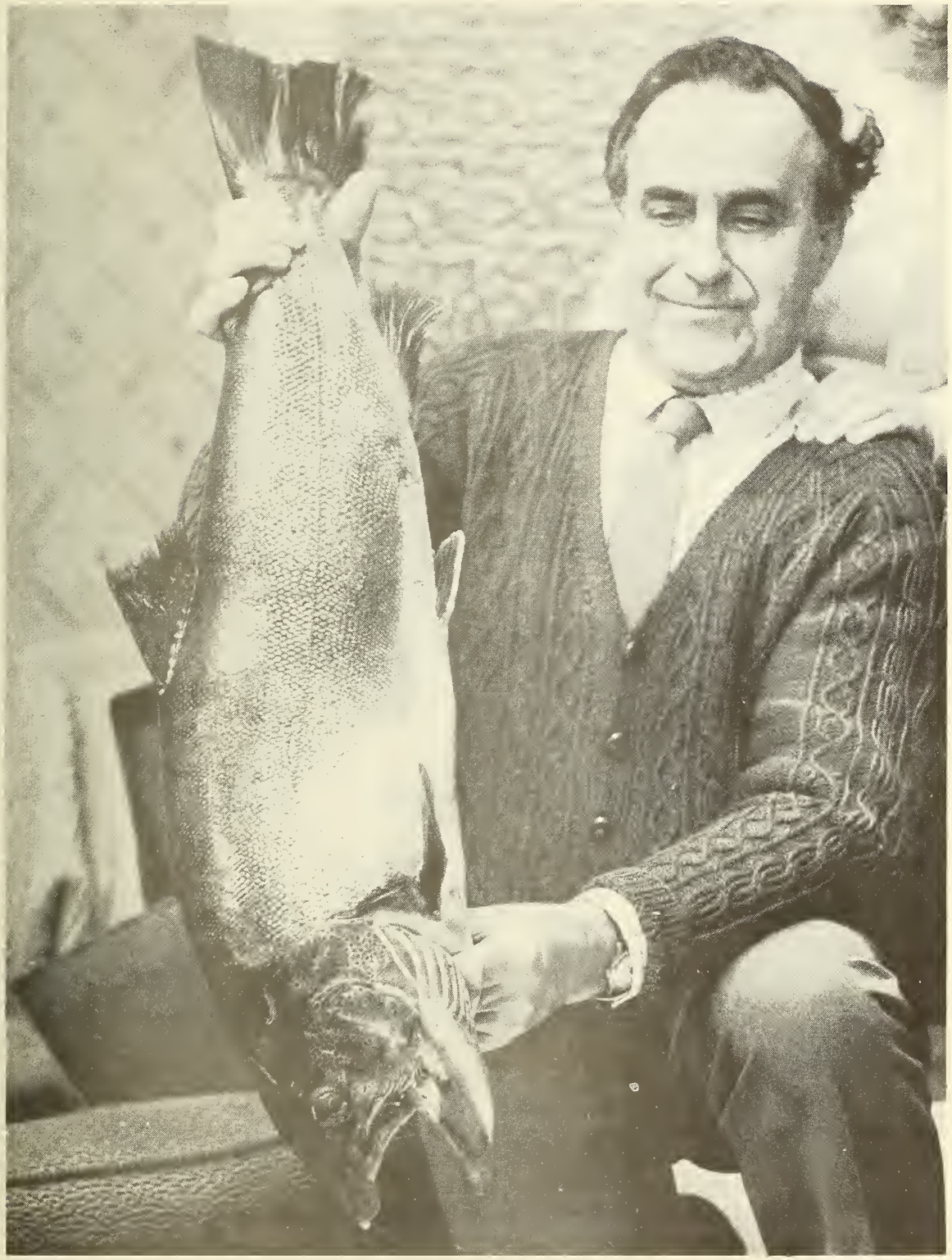
By J. IAN WADDINGTON
Director, Clyde River Purification Board

On 22nd April 1973 a Brown Trout *Salmo trutta* weighing 15¼ lbs. was caught by Mr. G. Blackmore, using a No. 16 hook with maggot bait; breaking strain of line: 2½ lbs.

The Trout was caught at the confluence of the Duneaton Water and River Clyde, Lanarkshire, in a deep pool called the Soldier's Hole (NS936260). Mr. Blackmore very kindly presented the fish to the Clyde River Purification Board, and examination in the Board's laboratories showed that the fish when caught was thirteen years old and in excellent condition, with no signs of disease or damage. To attain its large size and rapid rate of growth, this fish was without doubt a cannibal and probably had been so for the last six years of its life.

The accompanying photograph, reprinted by courtesy of the *Daily Express*, shows the fish being held by Mr. John Cameron, an executive member of the United Clyde Angling Protection Association, and gives a vivid impression of its remarkable size.

Mr. J. Ian Waddington, C.R.P.B., Rivers House, Murray Road, East Kilbride, Glasgow G75 OLA.



SOME OBSERVATIONS ON SCAVENGING OF SALMON *Salmo salar* CARRION

By J.H. CUTHBERT
Department of Agriculture and Fisheries for Scotland

During the course of field studies of feral Mink *Mustela vison* on the middle reaches of Tweed during 1968-69, Salmon carcases were examined for signs of scavenging activity. Between mid-October and late December two or three visits were made each week to a four kilometre stretch of river and on each occasion at least twenty carcases in varying stages of decay were observed.

Observations on the mammals and birds feeding on the carrion were entirely casual except that in some instances carcases were placed on sandy or muddy areas to aid observation of tracks.

The following species were seen to feed, or presumed to feed, on the Salmon carcases:

1. By direct observation (species seen feeding on carcases)

Herring Gull *Larus argentatus*
Lesser Black-backed Gull *L. fuscus*
Black-headed Gull *L. ridibundus*
Carrion Crow *Corvus corone*
Rook *C. frugilegus*
Brown Rat *Rattus norvegicus*

2. By indirect observation (tracks; mutilation and/or transportation of carcase)

Badger *Meles meles*
Fox *Vulpes vulpes*
Otter *Lutra lutra*
"Small mammals" (see below)
Dog

3. By inference (seen leaving site; feeding in near vicinity of carcase)

Blackbird *Turdus merula*
Song Thrush *T. philomelus*
Robin *Erithacus rubecula*
Common Gull *Larus canus*
Starling *Sturnus vulgaris*
Water Vole *Arvicola amphibius*
Domestic Cat

The species in List 3 are included on somewhat tenuous evidence, but observations suggest that the birds - particularly Common Gull, Blackbird and Starling - were feeding on fragments scattered around carcases by earlier visitors.

The positive identification of tracks of small mammals (List 2) was not possible because of the multiplicity of footprints. Species trapped in the area include Common Shrew *Sorex araneus*, Water Shrew *Neomys fodiens*, Bank Vole *Clethrionomys glareolus*, Short-tailed Vole *Microtus agrestis* and Long-tailed Field Mouse *Apodemus sylvaticus*. All these species, with the possible exception of the Short-tailed Vole, are known to take animal food (Southern, 1964). Common Shrews, Water Shrews and Bank Voles have eaten fish offal baits in Mink traps, and probably these three are the small mammal species most involved in feeding on Salmon carrion.

Although Otters and Foxes were not particularly numerous, there was sufficient evidence (at least four incidents for each species) to give positive indication of their feeding on the carrion. It was noted that whereas Otters appeared to feed on carcases *in situ*, Foxes on two occasions dragged carcases from near the water's edge to grassy areas.

It is commonly believed that Otters do not eat carrion. In addition to the evidence of Otters feeding on salmon carrion, Otter tracks were seen at the carcase of a drowned sheep and sheep wool was identified in nearby spraints. These observations support the previous reports of Otters eating carrion cited by Stephens (1957).

A large Badger sett was situated approximately 200 metres from the river near the centre of the study area. Any Salmon stranded within about 300 metres up- and down-stream from the sett were rapidly disposed of, seldom remaining for more than two or three days. Approximately 25 observations involving Badgers were made. It appeared that Badgers frequently dragged carcases into undergrowth well back from the river bank and consumed them there. Skeletal remains of Salmon were found at the sett on two occasions. The Badger was the only species seen to be an efficient scavenger, but with their discontinuous distribution Badgers can be credited with only a local aesthetic function.

No evidence was seen of Stoats *Mustela erminea*, Weasels *M. nivalis* or Mink feeding on salmon carcases, although all three species visited Mink traps baited with fish offal.

Few carcases of small fish (up to c. 500 gm) were observed and these usually disappeared without trace within a day. It

is thought that birds, probably Gulls, Rooks and Crows, were responsible.

During the period of observations there was a high incidence of the Salmon disease, ulcerative dermal necrosis (R.M. Ryan, Tweed Commissioners, *pers. comm.*). Speculation on the role of scavengers in the spread of the disease is not valid as the causative agent of UDN is as yet unidentified.

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Mr. J.H. Cuthbert, D.A.F.S., Scientific Services, East Craigs, Edinburgh, EH12 8NJ.

THE FRESHWATER FISHES OF KINTYRE

By J.A. GIBSON and DUNCAN COLVILLE
Kintyre Antiquarian and Natural History Society

The freshwater fish fauna of Kintyre is not large; indeed in quantity it consists almost entirely of Trout, Salmon, Eels and Sticklebacks. In the *New Statistical Account* the Rev. D. Macdonald, Minister of Killean and Kilchenzie parish, said (1843) "Neither charr, pike nor perch are to be found in any of the Kintyre lochs, rivers or streams". This is quite true. In Kintyre there are no native Pike, Perch or Charr, nor are there any Minnows, although Minnows which are used as live bait may occasionally escape and live for a time. From time to time some species have been introduced with limited success, and it may be that other localised introductions have taken place of which we have no knowledge. If so, we shall be very glad to have details.

This account of the freshwater fishes of Kintyre deals with all species of fish found in the burns, rivers and lochs of the peninsula and also includes all other fish usually classed as 'freshwater', even although, as far as Kintyre is concerned, they have been taken only at sea. Some species of fish are basically marine but are also regularly found in fresh or brackish water, and various textbooks differ as to which of these are treated as freshwater. In this paper we follow the guide-lines laid down by the accepted British authority, Dr. Peter S. Maitland, in his recent comprehensive book on British freshwater fishes (1972).

Our notes on Kintyre marine fish are given in a companion paper (Gibson, Colville and Gemmell, 1973).

SEA LAMPREY *Petromyzon marinus* Linnaeus, 1758
RIVER LAMPREY *Lampetra fluviatilis* (Linnaeus, 1758)

Both these lampreys are parasitic, and Salmon have not infrequently been caught in off-shore nets and in local rivers with typical circular wounds, which is a good indication of the presence of these lampreys in Kintyre waters. Definite records, however, are very few in number.

A Sea Lamprey was caught off Campbeltown by the fishing-skiff 'Bengullion' on 23rd September 1932. It was displayed in the window of Gilchrists the fishmongers in Campbeltown for some days, and caused considerable local interest, and some speculation, until it was identified (*Campbeltown Courier,* 24th September and 1st October 1932). One was caught in lower Loch Fyne,

on the fringe of our area, on 19th October 1960 (Bagenal, 1965).

The late Dugald Macintyre often caught Salmon in Kintyre rivers with the typical circular wounds, and on several occasions he saw a lamprey attached to a hooked fish, but these almost invariably detached themselves before the Salmon was landed. One which he managed to net in 1930 was subsequently identified by the local Fisheries Officer as a River Lamprey.

This, then, is the extent of our accurate information, although there is little doubt that both these lampreys occur regularly in Kintyre waters. Any additional information will be very welcome.

BROOK LAMPREY *Lampetra planeri* (Bloch, 1784)

According to Wheeler (1969) the Brook Lamprey is the most common lamprey in British streams. It presumably occurs in Kintyre rivers but, of course, is seldom encountered by the average fisherman, so accurate records are virtually non-existent. In the 1960s, however, when the upper reaches of the Machrihanish burn were being cleared out by a bulldozer, some lampreys were dredged up. These were examined by the local Fisheries Officer who declared them to be Brook Lampreys, and this identification was subsequently supported by the Marine Biological Station at Millport. To the best of our knowledge this remains our only definite record. The Brook Lamprey is non-parasitic.

STURGEON *Acipenser sturio* Linnaeus, 1758

Brook and Scott (1886) said "fine specimens are often noticed in Lochfyne during the herring fishery, but these are seldom captured". Whatever may be the truth of this statement, several specimens of the Sturgeon have been caught in Kintyre waters, as follows:

One in Peninver Bay, 30th August 1887 (*Campbeltown Courier,* 3rd September 1887; Scott, 1900).

One in Carradale Bay, 3rd December 1893 (*Campbeltown Courier,* 9th December 1893).

One near Carradale, autumn 1895 (Scott, 1900).

One at entrance to Campbeltown Loch, 15th October 1929 (*Campbeltown Courier,* 19th October 1929).

Two south-west of Ailsa Craig, on the fringe of our area, in August and September 1951 (*Scot. Nat.,* 1952: 104).

One off Davaar Island, 26th May 1954 (*Scot. Nat.,* 1956: 26).

One off Gigha, 3rd April 1956 (*Scot. Nat.,* 1961: 24).

ALLIS SHAD *Alosa alosa* (Linnaeus, 1758)

In 1888 Harvie-Brown and Buckley (*Vertebrate Fauna of the Outer Hebrides*, page 221), without specifying the exact locality, said "very large specimens taken in Loch Fyne, 1888", which is just on the fringe of our area, but the first specimen from true Kintyre waters was one reported by Mr. Alexander Gray, Curator of the Marine Station at Millport, in 1894, as follows: "A fine specimen of this fish was taken in a seine-net off Isle of Ross in the winter of 1894, and was put in spirits by me and left in the old museum in Kirk Street, Campbeltown, and is probably still preserved in the new museum there" (Scott, 1900).

Unfortunately this old specimen is now nowhere to be found in the Campbeltown Museum; it remained the only Kintyre record for a half-century until one was caught off Campbeltown in January 1944 (S.M.B.A. *Annual Report*, 1943-44: 15). Since then several specimens have been taken in the Clyde, of which the following are from Kintyre waters (all Kilbrannan Sound): One 3rd March 1958 (*Scot. Nat.*, 1962: 104), one 26th January 1959 (*Scot. Nat.*, 1962: 112), one 14th March 1961 (*Scot. Nat.*, 1964: 41). Others have been reported from 'Loch Fyne', without the exact locality being specified.

Most of the specimens have been accidental catches by commercial fishermen, which probably explains the lack of any record from waters west of Kintyre.

TWAITE SHAD *Alosa fallax* (Lacépède, 1803)

The only specimen of the Twaite Shad from Kintyre waters, and apparently the first record for the Clyde sea area, was caught by the Ayr boat 'Victory' fishing off Campbeltown in December 1943. The fish was recognised and obtained at Glasgow Fish Market on 22nd December 1943 by Mr. Gordon Bain of Paisley (Bain, 1944) and its identity was later confirmed by the Marine Biological Station at Millport (S.M.B.A. *Annual Report*, 1943-44: 15).

SALMON *Salmo salar* Linnaeus, 1758

Salmon are extremely common in Kintyre waters and are fished commercially at many places around the coast, including Southend, Machrihanish, Peninver, Ugadale, Carradale, Skipness and other places. In the early part of this century (around 1903-1904) a Salmon weighing 54 lbs was caught in the nets off Ugadale, and for some time was displayed in the shop window of Messrs Gilchrists, the fishmongers at Campbeltown. Salmon weighing 38 lbs and 42 lbs respectively were caught in the net at Peninver in early May 1877 (*Argyllshire Herald*, 12th May 1877).

To the best of our knowledge no Salmon approaching these sizes have been taken in the Kintyre rivers, but specimens of up to 20 lbs in weight have been caught fairly frequently, particularly in the River Barr. In 1966 a 24lb Salmon was taken in the Machrihanish Burn (Coutts, 1967), but this was extremely unusual since the normal weight for this river is 5-7 lbs.

Salmon occur commonly all round the shores and in the rivers, but are not present in any of the Kintyre hill-lochs, although attempts have been made to enable them to ascend the rivers. In the early part of this century, a Salmon 'ladder' was constructed at Clachan in an attempt to get Salmon into Loch Ciaran. The ladder was certainly completed, and even by the late 1940s water was still coming down it, but we have no indication that it was ever successful in getting Salmon to the loch; the reasons for its lack of success are not clear. Remains of this ladder, including a substantial metal framework over a gully, can still be seen. In the late 1920s improvements were made to the River Lussa to allow Salmon to ascend the falls, and "as a result of blasting operations the lower fall became passable for salmon, but not the other fall upon which a very bad job was made" (Macintyre, 1936). All this of course was well before the construction of the Lussa Dam. Although the falls of the River Lussa were impassable for Salmon it is interesting to note that Eels could get over.

TROUT *Salmo trutta* Linnaeus, 1758

The Trout is abundant in all Kintyre waters. Trout are extremely variable in colour and in body shape, depending on surroundings and habits, but all forms are varieties of a single species. The small dark Brown Trout *S.t. fario* L. largely inhabits the burns and hill-lochs and is not migratory; the large silvery Sea Trout *S.t. trutta* L. largely inhabits the offshore waters and rivers and is distinctly migratory.

Many of the Kintyre lochs are regularly stocked by proprietors or local angling clubs. As long ago as 1892 Harvie-Brown and Buckley in their *Vertebrate Fauna of Argyll and the Inner Hebrides* recorded that Loch Leven Trout had been introduced to Crosshill Loch, Campbeltown, and introductions along these lines have been repeated at many lochs in Kintyre.

Migratory Sea Trout sometimes get trapped. The late Dugald Macintyre gave an interesting account of the growth of Sea Trout which had become land-locked at Park (Skeroblin) Loch, near Campbeltown, and of their subsequent transfer to Crosshill Loch (*Field*, 10th July 1943).

The late Mr. Tom Broom caught two white Sea Trout in Achy Lochy about 1930; these had their identity confirmed by the well-known authority Mr. P.D. Malloch of Perth.

The weights of Trout obtained in Kintyre are extremely variable, depending on their locality, but large Sea Trout of up to 5lbs in weight are certainly caught from time to time. Trout of up to 10 lbs or even larger have occasionally been caught, but fish of this size are extremely rare in Kintyre. Moreover, one often hears reports of these fish at second-hand so one cannot always assume that they have been correctly identified.

RAINBOW TROUT *Salmo gairdneri* Richardson, 1836

This North American fish is now very popular with British anglers, and has been widely introduced to many waters throughout the West of Scotland. It seldom succeeds in establishing a breeding population, however, and requires regular re-introduction to keep up the stock.

On 27th June 1905 the late Mr. William McKersie introduced 500 Rainbow Trout and also one thousand Loch Leven Trout to Achy Lochy. Many were quickly caught in surrounding streams, but some Rainbow Trout remained in Achy Lochy for several years and Mr. Duncan Colville caught one there as late as 1912.

Mrs Pollok of Ronachan told us that Rainbow Trout, along with Loch Leven Trout and some American Brook Trout, were introduced to Loch Ciaran some time after the first world war, but they did not seem to survive long.

To our personal knowledge Rainbow Trout have also been introduced to several other waters in Kintyre, including Park (Skeroblin) Loch and Tangy Loch. Some years ago about one thousand were put into Loch Lussa and since then there has been occasional re-stocking.

AMERICAN BROOK TROUT *Salvelinus fontinalis* (Mitchill, 1815)

The late Mrs Pollok, of Ronachan, told us that shortly after the first world war her husband stocked Loch Ciaran with Rainbow Trout, Loch Leven Trout and some American Brook Trout. Rainbow and Loch Leven Trout have been introduced to many lochs in Kintyre, but this is the only record we have of the introduction of the Brook Trout, although we know that at one time it was introduced to many waters throughout the West of Scotland. We have no record of any catches, however, and to the best of our knowledge there are no Brook Trout in any Kintyre waters nowadays.

GUDGEON *Gobio gobio* (Linnaeus, 1758)

In a book of poetry entitled *The Casket* (or *The Siren Casket*), written by Archibald Munro and published in 1888, there is one poem entitled 'The Old Drumlemble Canal', which contains the line:

"Here Gudgeon and Perches the angler allured"

Archibald Munro was a native of Tangy Glen. He was born in 1827 and died in 1898, and he would know the Drumlemble Canal very well. This Canal functioned from just before 1800 until about 1850, and was partly filled in during the 1850s; there are instructions for the infilling of parts of the Canal in farm leases issued in 1856-57. The assumption is, therefore, that stretches were left unfilled for some years and that Gudgeon and Perch were introduced about this time to provide sport for local anglers. The Canal was completely filled in some time later, probably in the late 1860s, after which we have no information about Gudgeon or Perch. This is admittedly a very tenuous record, but we feel it is interesting and certainly worth recording.

MINNOW *Phoxinus phoxinus* (Linnaeus, 1758)

There are no native Minnows in Kintyre although, as we mentioned in the introduction, Minnows which are used as live-bait may occasionally escape and live for a time. We have heard of localised introductions to certain streams and ponds from time to time, but we have no indication that these introductions have ever become permanently established. We shall be very grateful for any additional information.

EEL *Anguilla anguilla* (Linnaeus, 1758)

The Eel is extremely common in all Kintyre waters; offshore, along the streams and burns, and in some of the hill-lochs. It is interesting that Eels can negotiate waterfalls and enter hill-lochs inaccessible to Salmon. Dugald Macintyre suggested that this was "possibly by climbing the spray-wetted rocks at night time" (*Game and Gun*, October 1941: 356).

Over the years the *Campbeltown Courier* and *Argyllshire Herald* have occasionally carried reports of Eels entering the Campbeltown water supply system and choking domestic water pipes. In 1951 there appeared to be a positive plague of Eels getting stuck in Campbeltown water pipes (see *Campbeltown Courier* for November and December 1951), but from then on new filters were installed and little subsequent trouble has been experienced.

THREE-SPINED STICKLEBACK *Gasterosteus aculeatus* Linnaeus, 1758

The Three-spined Stickleback is very common throughout most of the Kintyre river systems, and is often found off-shore near river-mouths. We have no record of the Ten-spined Stickleback.

SEA STICKLEBACK *Spinachia spinachia* (Linnaeus, 1758)

The Sea or Fifteen-spined Stickleback, which is almost wholly marine in habitat and is properly regarded as a marine fish, is very common amongst seaweed in shallow water along most of the Kintyre shore-line. We include it here simply because it is also found where the salinity is lowered, at the mouths and sometimes, at high tide, quite far up some Kintyre rivers. We have caught it in the Machrihanish burn near the first bridge on the golf course.

PERCH *Perca fluviatilis* Linnaeus, 1758

As discussed under Gudgeon, (see above), it seems probable that some Perch were introduced to the old Drumlemble Canal in the 1850s.

COMMON GOBY *Pomatoschistus microps* (Kroyer, 1840)

A species of small goby occurs fairly commonly in the brackish, intertidal pools near river mouths at all suitable places around the Kintyre coastline. These tiny gobies frequently inhabit very shallow pools, sometimes only a few inches deep, where they occasionally partly burrow in the sand, and are fairly often caught, along with the even more abundant tiny Flounders, by children.

Small gobies occur commonly in sandy inshore waters all round Kintyre, and have been described as 'common and generally distributed' in the estuary, and as 'frequent' in East Loch Tarbet, as far back as the 1880s by Brook, Scott and subsequent authors, all of whom write of the species as *minutus*.

Within recent years, however, much work has been done on the taxonomy of these gobies, and Wheeler (1969), in his authoritative work on British and European fishes, says that *P. microps*, the Common Goby, is typical of sandy intertidal shore pools, often only an inch or so deep, tolerates water of moderately low salinity and is usually regarded as a freshwater fish; *P. minutus*, the Sand or Freckled (Speckled) Goby is typical of sandy inshore waters to the tide line, but is not usually found intertidally or in estuarine areas, and is usually regarded as marine. As usual, popular English names have bedevilled the whole position and *minutus* was often called the Common Goby in the past.

This is not helped by the fact that *microps* (now called Common Goby) is often found in sandy shore pools, whereas *minutus* (now called Sand Goby) is found not so much in sandy pools as in slightly deeper water offshore.

We have examined many specimens of these intertidal gobies collected from shore pools near the river mouths at Carradale, Machrihanish and Southend, and all exhibited the typical external appearance of *microps*. Moreover, Dr. Gibson, with the aid of a hand-lens, counted the number of scales in a line along the side; no specimen had more than fifty scales, in keeping with Wheeler's identification key for *microps*. As a comparison, we examined some specimens of gobies taken offshore for us by local shrimp fishermen; these had up to seventy scales along the side, in keeping with Wheeler's identification key for *minutus*.

We can definitely state, therefore, that we have identified the Common Goby *P. microps* from Carradale, Machrihanish and Southend, and have no real doubt that this little fish is widely distributed in all suitable areas around Kintyre; this will usually mean where Kintyre rivers and burns come down to sandy shores.

THICK-LIPPED MULLET *Crenimugil labrosus* (Risso, 1826)

A baby fish of only 3.3 cm. was taken in November 1951 by a beach-seine operated by members of the Aberdeen Marine Laboratory staff on the shore of Loch Fyne (*Scot. Nat.*, 1952: 110). One was caught in 'Loch Fyne' about 23rd June 1956 (*Scot. Nat.*, 1961: 31). No exact localities are given for these Loch Fyne captures, but we mention them here as being possibly on the fringe of our area.

FLOUNDER *Platichthys flesus* (Linnaeus, 1758)

Flounders are common around all suitable parts of the Kintyre coast-line; they commonly enter the Kintyre rivers, and on occasions have been caught in rivers and streams up to two miles from the open sea. While fishing in the Machrihanish burn the late Dugald Macintyre once had the possibly unique experience of catching a Flounder and a Trout on the one hook; "I had a prolonged series of nibbles and 'nursing' the bait I struck sharply, to bring to the surface and eventually land a brown trout and a flounder. The fish had been attacking the big lob-worm I used as bait from opposite sides, and, as their mouths met, my strike hooked them both".

In the sandy intertidal pools near the mouths of rivers tiny Flounders abound during the summer months, and are caught in hundreds by children. These young Flounders are far and away the fish most commonly caught by children in Kintyre.

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Dr. J.A. Gibson, Foremount House, Kilbarchan, Renfrewshire.
Mr. Duncan Colville, Kilgour, Machrihanish, by Campbeltown.

NOTES ON THE MARINE FISHES OF KINTYRE

By J.A. GIBSON, DUNCAN COLVILLE and J.C. GEMMELL
Kintyre Antiquarian and Natural History Society

In a companion paper (Gibson and Colville, 1973) we give what we hope can be regarded as a comprehensive account of the freshwater fishes of Kintyre, but we are not attempting the same for the marine fishes. In the *New Statistical Account* for the parish of Killean and Kilchenzie the Rev. D. Macdonald, writing in October 1843, said "the sea along the west coast furnishes a great variety of nutritive fish" and in the account of the parish of Saddell and Skipness the Rev. John Macfarlane, writing in November 1843, said "almost every kind of British fish may be taken off the [Kintyre] coast". With this we entirely agree. To describe the marine fishes around Kintyre in any detail would simply be to describe the entire fish fauna of the whole of the Clyde area and the West of Scotland, which is clearly quite outwith the limits of this paper.

We have restricted this list, therefore, to the more unusual fishes which have been caught in the surrounding seas, or have been landed at Kintyre ports, and to any unusual events or sizes of fish which have come to our notice. This list is based on our own notes and on what we have been able to discover from a search of local newspapers and the relevant scientific journals; it has also been supplemented by records from the Scottish Marine Biological Station at Millport, many local Fishery Officers throughout the years, Mr. William Gilchrist and other fishmongers in Campbeltown, and Dr. B.B. Rae of the Marine Laboratory of the Department of Agriculture and Fisheries for Scotland at Aberdeen. In Kintyre there is still a substantial herring fishing industry, plus other commercial fishing activities, based largely in Campbeltown and Carradale, and unusual fish caught by fishing boats in the vicinity are frequently landed at these Kintyre ports; this has been an important source of information. To all these observers, who have contributed information in their various ways, we are extremely grateful.

Some of the more interesting records in this list are very old. These date from the time of the Marine Laboratory at Tarbert, the intensive collecting carried out at the end of last century under the direction of Sir John Murray in his steam yacht 'Medusa', largely reported by Gunther (1888) and Chumley (1918), and the research activities of the Fishery Board for Scotland in the steamship 'Garland', largely reported by Smith (1891) and Scott (1900). Moreover, Mr. Alexander Gray, Curator

of the Marine Station at Millport at the turn of the century, was a Campbeltown man and so took a personal interest in fish records from Kintyre waters. The lack of recent records, therefore, may imply not any change in status but simply lack of recent collecting.

The locality of some fish records is often not accurately known, since the discovery of an unusual fish is sometimes made only when a fishing boat's catch is being inspected in port, and the fishing area may have been extensive. Moreover, even with published records, some of the more frequently quoted localities such as 'off Ailsa Craig', 'Loch Fyne', 'south of Gigha' etc, may well refer to Kintyre waters, but on further enquiry it is often impossible to discover any more accurate information. We have usually excluded such records, therefore, unless we have been able to get an indication that they could reasonably be referred to 'waters around Kintyre', which in itself is a somewhat elastic term.

This paper is very much a personal selection of records and, as indicated above, it cannot hope, nor is it intended, to be a detailed account of the marine fishes of Kintyre, but we trust it will contain many items of interest to other naturalists. The records are given in somewhat summary form, but with full references where these are available, so further details can be obtained by any interested workers. Arrangement and nomenclature follows *The Fishes of the British Isles and North-West Europe,* by A.C. Wheeler, London (Macmillan), 1969.

GREATER-SPOTTED DOGFISH *Scyliorhinus stellaris* (Linnaeus, 1758)

One between Ailsa Craig and Sanda, June 1946 (Gibson, 1951). One 14' WSW of Ailsa, 8th August 1968 (Rae and Pirie, 1968).

PORBEAGLE SHARK *Lamna nasus* (Bonnaterre, 1788)

One caught off Arran, in Kilbrannan Sound, in August 1920 (Elmhirst, 1926). Reported many times by fishermen in Kilbrannan Sound, and specimens occasionally landed.

Although at one time regarded as uncommon, we agree with Elmhirst's statement (1926) that the Porbeagle is "by no means rare" in the Firth of Clyde.

BASKING SHARK *Cetorhinus maximus* (Gunnerus, 1765)

Common in Kilbrannan Sound and off West Kintyre during summer; never seen in winter. Formerly hunted commercially, and shark liver oil factory at Carradale, 1937 - early 1950s. Occasionally stranded on Kintyre shores; one at Machrihanish in 1919 measured almost exactly forty feet in length.

THRESHER SHARK *Alopias vulpinus* (Bonnaterre, 1788)

One caught in Machrihanish Bay, July 1893 (*Campbeltown Courier,* 15th July 1893; also Scott, 1900, where date mistakenly given as 1895). One caught in Kilbrannan Sound and landed at Machrie, Arran, in August 1922 (Elmhirst, 1926). One in Kilbrannan Sound, November 1937 (*Scotsman,* 4th December 1937).

"Numerous verbal records of this species reach one, which are probably correct, as the tail is distinctive" (Elmhirst, 1926). We agree with this statement, and have several sight records from fishermen in the Kilbrannan Sound.

BLUE SHARK *Prionace glauca* (Linnaeus, 1758)

"Taken in Lochfyne" (Harvie-Brown and Buckley, 1888). One caught at Carradale on 17th November 1899 (*Campbeltown Courier,* 18th November 1899), and an earlier probable record from Carradale in August 1899 (*Campbeltown Courier,* 26th August 1899). One caught off Trench Point, Campbeltown, on 22nd November 1901 (*Campbeltown Courier,* 23rd November 1901).

TOPE SHARK *Galeorhinus galeus* (Linnaeus, 1758)

One caught off Carradale in mid-September 1951, and exhibited in window of J. Thomson, fishmonger, Campbeltown (*Campbeltown Courier,* 20th September 1951).

GREENLAND SHARK *Somniosus microcephalus* (Bloch and Sch., 1801)

We have some very old records of 'Greenland Sharks' from the surrounding seas last century, but have no way of assessing their accuracy. They may possibly be correct, however, for it is known that Greenland Sharks used to be fairly common in the north-western Atlantic until about the turn of the century, but since then they have become very rare and their disappearance has been linked with the rise in temperature of the Arctic seas since the beginning of this century (Tåning, 1949).

A Greenland Shark was said to frequent Kilbrannan Sound for three years in the mid-1920s and to be well-known to the local fishermen (Dr. Norman Morrison, *Scotsman,* 19th January 1929).

ELECTRIC RAY *Torpedo nobiliana* Bonaparte, 1835

One NW of Ailsa Craig in August 1951 (*Scot. Nat.,* 1952: 103).

SKATE *Raja batis* Linnaeus, 1758

One, 6 feet 7 inches by 5 feet 3 inches, caught off Mach-

rihanish on 12th September 1879 (*Argyllshire Herald*, 20th September 1879).

One, seven feet by 5 feet 6 inches, and weighing 170 lbs, caught in Carradale Bay, 7th November 1911 (*Argyllshire Herald*, 11th November 1911).

One 6 feet 4 inches by 5 feet 4 inches, caught in Kilbrannan Sound and landed at Lochranza about 14th September 1929 (*Campbeltown Courier*, 21st September 1929).

SHAGREEN RAY *Raja fullonica* Linnaeus, 1758

One caught in lower Loch Fyne, off Great Sgat island, on 4th November 1887; one caught in Kilbrannan sound, March 1888 (Günther, 1888).

SPOTTED RAY *Raja montagui* Fowler, 1910

One was obtained in the Sound of Sanda, March 1888 (Günther, 1888); one west of Ailsa Craig on 27th April 1897, and one off Rhuad Point, Kintyre, on 25th May 1897 (Scott, 1900).

HERRING *Clupea harengus* Linnaeus, 1758

A Herring 23 inches long and 4¼ lbs in weight was caught at Black Bay, Isle of Ross at end of May 1888 (*Campbeltown Courier*, 2nd June 1888).

A Herring measuring 14½ inches long, 8 inches in girth, and weighing 11 lbs was caught in Kilbrannan Sound on 12th September 1931. It was exhibited in the windows of Messrs William Gilchrist & Sons, Fishmongers, Campbeltown, for some time (*Campbeltown Courier*, 19th September 1931).

"An old native of the town, discussing the herring fishing the other day, recalled seeing in his boyhood, maybe seventy years ago, Campbeltown Loch teeming with herring up to Lochend. So great were the hauls that the bulk of them could not be marketed, and cart loads were taken out to the Laggan to be used as manure" (*Campbeltown Courier*, 24th October 1931).

In 1900 the *Campbeltown Courier* reported the finding of a watch-chain inside a Herring (*Campbeltown Courier*, 11th November 1942).

CONGER EEL *Conger conger* (Linnaeus, 1758)

Conger Eels are fairly regularly caught in lobster creels. One caught this way near Machrihanish in early July 1973 measured seven feet in length.

GARFISH *Belone bellone* (Linnaeus, 1758)

One caught in Loch Fyne (Scott, 1900). Caught in herring nets in Kilbrannan Sound in 1919 and 1920 and "judging by fishermen's reports an occasional summer visitor to the area" (Elmhirst, 1926). One caught in herring net and landed at Campbeltown on 9th July 1932 measured 21½ inches in length.

DEEP-SNOUTED PIPEFISH *Syngnathus typhle* Linnaeus, 1758

One taken in East Loch Tarbert, 1885 (Brook and Scott, 1886).

SNAKE PIPEFISH *Entelurus aequoreus* (Linnaeus, 1758)

One taken in East Loch Tarbert, 1885 (Brook and Scott, 1886).

WORM PIPEFISH *Nerophis lumbriciformis* (Jenyns, 1835)

One taken in East Loch Tarbert, 1885 (Brook and Scott, 1886); one taken in Campbeltown Loch, about 1899 (Scott, 1900). Bagenal (1965) said "frequent inshore", but these are actually the only two records we know of for Kintyre waters.

SEA-HORSE *Hippocampus ramulosus* Leach, 1814

One taken in Kilbrannan Sound, autumn 1894 (Scott, 1900).

BIB *Trisopterus luscus* (Linnaeus, 1758)

"Occasionally in Tarbert harbour" (Brook and Scott, 1886), and in lower Loch Fyne (Scott, 1900). "Two, 13 inches in length, were obtained near Sanda Island in May 1897" (Scott, 1900). One caught near Campbeltown on 31st March 1962 measured 10 inches in length and weighed 2 lbs (photographed by Mr. Gemmell).

NORWAY POUT *Trisopterus esmarkii* (Nilsson, 1855)

The first British specimens of this fish were taken in the Kilbrannan Sound in 1887, where they were found "in tolerable abundance" (Günther, 1888). Nowadays it is well known in the Firth of Clyde.

COD *Gadus morhua* Linnaeus, 1758

One weighing 45 lbs landed at Campbeltown (*Bulletin* newspaper, 7th May 1931, with photograph).

TORSK *Brosme brosme* (Ascanius, 1772)

"The sea along the west coast" of Kintyre (*New Statistical Account*, Parish of Killean and Kilchenzie, 1843).

GREATER FORK-BEARD *Phycis blennoides* (Brünnich, 1768)

One caught to the north of Arran at end of March 1914 (*Scot. Nat.*, 1914: 166); one taken south-west of Gigha in 1956 (*Scot. Nat.*, 1961: 27); two caught in 'Loch Fyne' in March 1957 (*Scot. Nat.*, 1961: 38); one off Ailsa Craig, 26th April 1965 (*Glasg. Nat.*, 18: 574).

THREE-BEARDED ROCKLING *Gaidropsarus vulgaris* (Cloquet, 1824)

One caught off Mull of Kintyre, March 1888 (Günther, 1888).

OPAH or KING FISH *Lampris guttatus* (Brünnich, 1788)

One in Hunterian Museum from near Campbeltown in 1864 (Harvie-Brown and Buckley, 1888; Scott and Brown, 1901).

JOHN DORY *Zeus faber* Linnaeus, 1758

Brook and Scott (1886) said "usually enter Tarbert Harbour in September to feed on the herring offal" and "frequently taken off Carradale Pier". Scott (1900) recorded several specimens taken by the Fishery steamer 'Garland' in the area of the Kilbrannan Sound during the 1890s.

There would appear to have been a change in status, however, for we have had none reported for many years, and Bagenal (1965) said "rare". One was caught off Skipness on 7th January 1966 (Halliday, 1969).

BOAR-FISH *Capros aper* (Linnaeus, 1758)

One caught off Skipness in the Kilbrannan Sound, 6th January 1961 (*Scot. Nat.*, 1964: 42). Apparently the first published record for the Clyde.

RED MULLET *Mullus surmuletus* Linnaeus, 1758

One caught in 'Loch Fyne', 8th January 1952 (*Scot. Nat.*, 1953: 149). One caught at Rhu Hanish, south of Campbeltown, 26th September 1958 (*Scot. Nat.*, 1962: 107); one caught near Campbeltown on 13th October 1962 and photographed by Mr. Gemmell.

RED SEA BREAM *Pagellus bogaraveo* (Brünnich, 1768)

One washed ashore in East Loch Tarbert, 1885-86 (Scott, 1900); one off Campbeltown (S.M.B.A., *Annual Report*, 1943-44: 14).

BLACK SEA BREAM *Spondyliosoma cantharus* (Linnaeus, 1758)

One off Arran in Kilbrannan Sound (S.M.B.A., *Annual Report*,

1943-44: 16); one off Skipness on 19th September 1955, and another in lower Loch Fyne on 10th October 1955 (*Scot. Nat.*, 1956: 102).

RED BAND-FISH *Cepola rubescens* Linnaeus, 1766

Two caught off Davaar island on 21st June 1961 and photographed by Mr. Gemmell (*Scot. Nat.*, 1964: 44); one caught in Kilbrannan Sound on 7th December 1961 (*Scot. Nat.*, 1964: 44).

CUCKOO WRASSE *Labrus mixtus* Linnaeus, 1758

Said to be found "occasionally at the mouth of East Loch Tarbert" in 1885 (Brook and Scott, 1886). We know of no further records. Bagenal (1965) said "rare".

CORKWING or BAILLON'S WRASSE *Crenilabrus melops* (Linnaeus,1758)

One in lower Loch Fyne on 10th May 1958 (*Scot. Nat.*, 1962: 107).

BONITO *Sarda sarda* (Bloch, 1793)

One caught at Carradale, 3rd September 1921 (*Field*, 10th September 1921).

SCORPION GOBY *Lebetus orca* (Collett, 1874)

One in Kilbrannan Sound on 22nd March 1888, originally described as Jeffreys's Goby (Günther, 1888), was later assigned to this species (Collett, 1896; Miller, 1963). One north of Arran, on fringe of our area, between 1901 and 1906 (Patience, 1906).

FRIES'S GOBY *Lesueurigobius friesii* (Collett, 1875)

One caught off Campbeltown in December 1943 (Bain, 1944; S.M.B.A., *Annual Report*, 1943-44: 14).

JEFFREYS'S GOBY *Buenia jeffreysii* (Günther, 1888)

Two, a male and female, were described by Günther (1888) from the Kilbrannan Sound on 22nd March 1888, but the male was later assigned to the species *Lebetus orca* (Collett, 1896; Patience, 1906; Miller, 1963).

YARRELL'S BLENNY *Chirolophis ascanii* (Walbaum, 1792)

One taken amongst boulders at low water, East Loch Tarbert, 1885 (Brook and Scott, 1886).

SAND-SMELT or ATHERINE *Atherina presbyter* Valenciennes, 1835

Frequent amongst zostera in East Loch Tarbert in the spring of 1885, but not met with later (Brook and Scott, 1886).

Scott (1900) quoted Mr. Alexander Gray, of the Millport Marine Station, as follows: "On two occasions I saw shoals of these little fishes in Campbeltown Loch - once at the Kilbrennan shore, where they were pursued by a number of guillemots, which chased them so keenly that they jumped clean up on the gravelly beach, and I collected quite a number of living specimens. Many of the fishes were fully two feet from the water's edge".

"West of Arran - 1936-40" (S.M.B.A., *Annual Report*, 1943-44: 14).

These are our only records.

NORWAY HADDOCK *Sebastes marinus* (Linnaeus, 1758)

One caught near Campbeltown on 6th February 1961 was displayed in the window of Thomson's fish shop in Campbeltown for some days; it weighed 2 lbs. One was caught off Ailsa Craig on 6th May 1964 (*Glas. Nat.*, 18: 574).

STREAKED GURNARD *Trigloporus lastoviza* (Bonnaterre, 1788)

Said to be "not common" in East Loch Tarbert in 1885 (Brook and Scott, 1886). Several taken in Kilbrannan Sound and near the mouth of the Clyde in the late 1890s (Scott, 1900). We have no further records.

MURRAY'S TRIGLOPS *Triglops murrayi* Gunther 1888

"Several specimens, from 2½ to 4 inches long, were obtained in the Mull of Cantyre, at a depth of 64 fathoms, in the months of February and March (1888), and 4 miles south-east of the island of Sanda, in 35 fathoms, in the middle of March" (Günther, 1888).

These were the first specimens of this fish known to science; it was described by Dr. Günther without an English name, but has subsequently been called Murray's Triglops or Murray's Sea-Scorpion.

Another specimen was taken "a short distance to the eastward of Sanda" (Scott, 1897). To the best of our knowledge there are no further Clyde records.

NORWAY BULLHEAD *Taurulus lilljeborgi* (Collett, 1875)

The first British specimen of this fish was taken in the Clyde off the Ayrshire coast in July 1887. It was described by Dr. Günther, who received a second specimen, from the Sound of Sanda, in 1888 (Günther, 1888).

LUMPSUCKER *Cyclopterus lumpus* Linnaeus, 1758

One caught in a herring-net in Kilbrannan Sound and landed at Campbeltown on 14th October 1933 was presented by Mr. Gilchrist, the fishmonger, to Mr. Gemmell, who photographed it; it measured 10¾ inches long.

One found dead at Crossaig beach on 23rd December 1958 measured 12 inches long, and was photographed by Mr. Gemmell.

One was caught in the salmon nets at Machrihanish on 1st July 1964; it measured 12 inches long and was photographed by Mr. Colville.

SEA SNAIL *Liparis liparis* (Linnaeus, 1766)
MONTAGU'S SEA SNAIL *Liparis montagui* (Donovan, 1805)

There is often confusion between the two species of sea snails. Brook and Scott (1886) recorded both species "between tide marks" in Loch Fyne and East Loch Tarbert, but Wheeler (1969) says that the Sea Snail is "rarely, if ever, found on the shore" and that records of its intertidal occurrence are "probably due to confusion with Montagu's Sea Snail".

Günther (1888) and Scott (1900) recorded many specimens of the Sea Snail from deep water off the Mull of Kintyre. A specimen of a sea snail taken in herring-nets in the Kilbrannan Sound on 5th September 1911 was exhibited in McGown's the fishmongers in Campbeltown (*Argyllshire Herald,* 9th September 1911). It measured under 3 inches long and was subsequently identified as a Montagu's Sea Snail (Montagu's Sucker) by the local Fishery Officer.

TURBOT *Scophthalmus maximus* (Linnaeus, 1758)

"A HUGE FISH. On Thursday morning (16.4.1902) Mr. John McMillan and crew, fishing on the west bank near Sanda in the line skiff 'Mary and Agnes', secured a fine Turbot which turned the scale at 133 pounds. It was bought by Mr. J. Jordan and despatched to the Glasgow market" (*Argyllshire Herald,* 19th April 1902).

The Mr. Jordan mentioned above was a well-known dealer in natural history specimens who had a shop in Campbeltown, so it is clear that this fish was something very much out of the ord-

inary. Nevertheless, this is a well-nigh unbelievable size for a Turbot, for which Wheeler (1969) says "a weight of 55 lbs is claimed to be maximal", so the possibility that it is a misprint for 33 lbs must be seriously considered. We have searched other contemporary records in an attempt to get additional information, but without success.

BRILL *Scophthalmus rhombus* (Linnaeus, 1758)

We consider this to be an uncommon fish in Kintyre waters. One caught locally and landed at Campbeltown on 31st January 1931 was purchased by Mr. Gemmell from Gilchrists the fishmongers; it measured 16 inches long.

COMMON TOPKNOT *Zeugopterus punctatus* (Bloch, 1787)

"In the vicinity of Ailsa Craig and in Kilbrennan Sound" (Scott, 1900). Specimens were caught off Skipness Point, off Sanda, and west of Ailsa Craig between 1923 and 1967 (Rae, 1971).

ECKSTROM'S TOPKNOT *Phrynorhombus regius* (Bonnaterre, 1788)

Several specimens were captured in a shallow sandy bay at Barmore, Loch Fyne, in 1885 (Brook and Scott, 1886; Scott, 1900). This is just on the fringe of our area.

NORWEGIAN TOPKNOT *Phrynorhombus norvegicus* (Günther, 1862)

One was caught in Kilbrannan Sound on 22nd March 1888 (Günther, 1888); prior to this paper by Dr. Günther only one Scottish specimen was known. One was caught off Skipness some time between 1963 and 1966 (Halliday, 1969).

SCALDFISH *Arnoglossus laterna* (Walbaum, 1792)

The first specimen of a Scaldfish taken in Scottish waters was one caught in the Kilbrannan Sound in March 1888 (Günther, 1888). During the 1890s the steamship 'Garland' of the Scottish Fishery Board caught one between Sanda and Bennan Head, Arran, and in 1899 "a few" were taken by the 'Garland' in the Kilbrannan Sound and the outer reaches of the Clyde (Scott, 1900). One was caught between Rhuad Point, Kintyre, and Ailsa Craig on 4th October 1901 (Scott, 1902). Several other specimens caught in the outer parts of the Firth of Clyde up till 1930 were recorded by Rae (1971).

HALIBUT *Hippoglossus hippoglossus* (Linnaeus, 1758)

One weighing at least 224 lbs caught at Ugadale (*Argyllshire Herald*, 9th May 1868).

One weighing 135 lbs caught off Kildalloig on 14th January 1876 (*Argyllshire Herald,* 22nd January 1876).

One weighing 155 lbs caught off Davaar on 5th August 1884 (*Argyllshire Herald,* 9th August 1884).

One weighing 180 lbs landed at Campbeltown on 13th April 1889 (*Argyllshire Herald,* 20th April 1889).

One weighing 168 lbs caught off Carradale at end of June 1891 (*Campbeltown Courier,* 4th July 1891).

One weighing 168 lbs landed at Campbeltown at end of October 1942 (*Campbeltown Courier,* 31st October 1942).

SOLENETTE *Buglossidium luteum* (Risso, 1810)

Recorded as taken in Kilbrannan Sound in seine net (S.M.B.A. *Annual Report,* 1943-44: 15).

THICKBACK SOLE *Microchirus variegatus* (Donovan, 1802)

Two were obtained near the Mull of Kintyre on 31st March 1888 (Günther, 1888). Two were caught near Sanda on 15th June 1899 (Scott, 1900; Scott and Brown, 1901). Recorded from Carradale by Chumley (1918).

TRIGGER-FISH *Balistes carolinensis* (Gmelin, 1789)

The second Scottish record of this rare fish, and the first record for over a hundred years, was one found on Machrihanish beach on 14th November 1958 by Mr. D.J.F. Colville. The fish, which had been damaged by seabirds, measured 54 cm; it was presented to the Royal Scottish Museum (*Scot. Nat.,* 1962: 108). In view of its importance, this record will be the subject of a separate report.

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JAMES CRAIG GEMMELL

We very much regret to state that Mr. Gemmell died, at the age of 86, just before this paper was being prepared for publication. For many years Mr. Gemmell was science master at Campbeltown Grammar school; he had a life-long interest in marine biology, particularly in marine fishes, and was an acknowledged expert whose opinion was regularly sought locally for the identification of rarer species of fish; it was Mr. Gemmell who originally identified the specimen of the Trigger or File Fish found at Machrihanish. We feel it is proper that Mr. Gemmell's name should be retained as co-author of this paper on the marine fishes of Kintyre.

Dr. J.A. Gibson, Foremount House, KILBARCHAN, Renfrewshire.
Mr. Duncan Colville, Kilgour, MACHRIHANISH, by Campbeltown.

THE DESTRUCTION OF A BRONZE AGE CAIRN ON EAST GREEN FARM, KILMACOLM

By FRANK NEWALL
County Archaeological Recorder
Renfrewshire Natural History Society

In 1952 Mr. William O. Black, farm contractor, brother of Mr. James Black of East Green farm, visited the farm with me to inspect several mounds. Attention was finally concentrated on a circular mound sited relatively low, but on the crest of a local rise which, assisted by a few aged trees, rendered it a conspicuous landmark (NS340687). With flattened top upcurving slightly from a lower scarped edge it preserved the profile of a prehistoric round cairn.

William Black subsequently, after ploughing, produced from the north edge of the area a small sherd of crumbling black ware loosely assignable to the Bronze Age-Early Iron Age. No further sherds offered but a continuing contribution of flint and stone artefacts was made by him from East Green fields to match the similar accumulation gathered from neighbouring Lawpark farm by Duncan McKinnon and the writer (*Note 1*). Among those who assisted there, was Ronald Kettles.

In 1956 the edge of the cairn was sectioned at five points to unearth a vixen and four cubs. William Black recognised the "built wall" uncovered by his nephews. The site was visited and the cairn and exposed peristalith recorded and planned. As it was strictly confined within a rectangular fenced enclosure projected eastwards from a main boundary fence, this fence was used as datum. The diameter then recorded, 31 ft. was, however, an error, due to the fact that the "fox trenches" had revealed on the north east not the true peristalith but the boulder kerb of an inner enclosure (*Note 2*).

James Black, despite the value of the heavy kerb boulders, 1½ ft.x 2 ft.x 2½ft., for building, was prevailed upon to preserve the site, and planted young firs on it. In 1967, however, when extra accommodation was required, the cairn site appeared the only suitable barren spot midst cultivated land on which to erect a farm cottage. On the twelfth of July of that year William Black reported that a bulldozer had arrived to remove the cairn.

When we reached the site the bulldozer was already at work, and the prospect seemed bleak - and then, a rare moment of delight, I recognised the bulldozer operator, Ronald Kettles. Further, while the enclosure had been removed to facilitate

operations the main datum fence of 1956 was intact, and as yet only part of the upper structure of the cairn had been removed from the south west quarter (*Note 3*).

Mr. Kettles and I held a summit conference, considering all possibilities. Thereafter, never was bulldozer more skilfully employed, and never have I experienced a more exacting period of concentrated recording. Mr. Kettles removed the upper cairn, grazing the kerb, by quadrant, south west, south east, then north west and north east; and, in each quadrant, finally the peristalith and the kerbing of an inner chamber, by cutting at right angles to the lines of stones. There was no cessation. The record was a succession of pencilled sketches and notes. The kerbing was recorded by offset every five feet along the datum fence, intermediate stones being drawn in by eye; each measurement taken as the bulldozer moved off to a dump on the north of the site.

We began at 11 a.m. and stopped at 7.30 p.m. The cairn was finally completely removed on the following day. Mr. Kettles had agreed to stop at an unctuous black layer, which was patently the pre-cairn surface. In the event, disappointed at having failed to locate either cist, burial, or sherd at the centre, he persisted to bed rock and exposed a round central pit, No. 14, and to the south, pits Nos. 1-3.

The report on the cairn which follows is best accepted as a resurrection, a fusion of detail noted under pressure.

Following the removal of the cairn James Black readily permitted a temporary fence to be erected, and the pre-cairn surface to be thoroughly explored. In all a total of seven days were spent in completely trowelling the area, some 350sq. yds (*Note 4*).

SITE

The site is a table of somewhat rotted porphyritic trap overlaid by glacial till typical of the district (*Note 5*). Here and there patches of grey, pink, or purplish boulder clay occur. Over all passed an unctuous black, in places almost carbonaceous, pre-cairn vegetation layer. This was in general full of small carbonised twigs, suggesting a scrubby growth on or near the spot before the erection of the cairn.

THE CAIRN

Over the peristalith the cairn measured 42 ft. north-south by 41 ft. east-west, and rose above modern ground level to a maximum height of 11 ft. on the north and east sides, and to a minimum height of 4 ft. on the west. The outline was not strictly circular, but included short linear stretches on the east

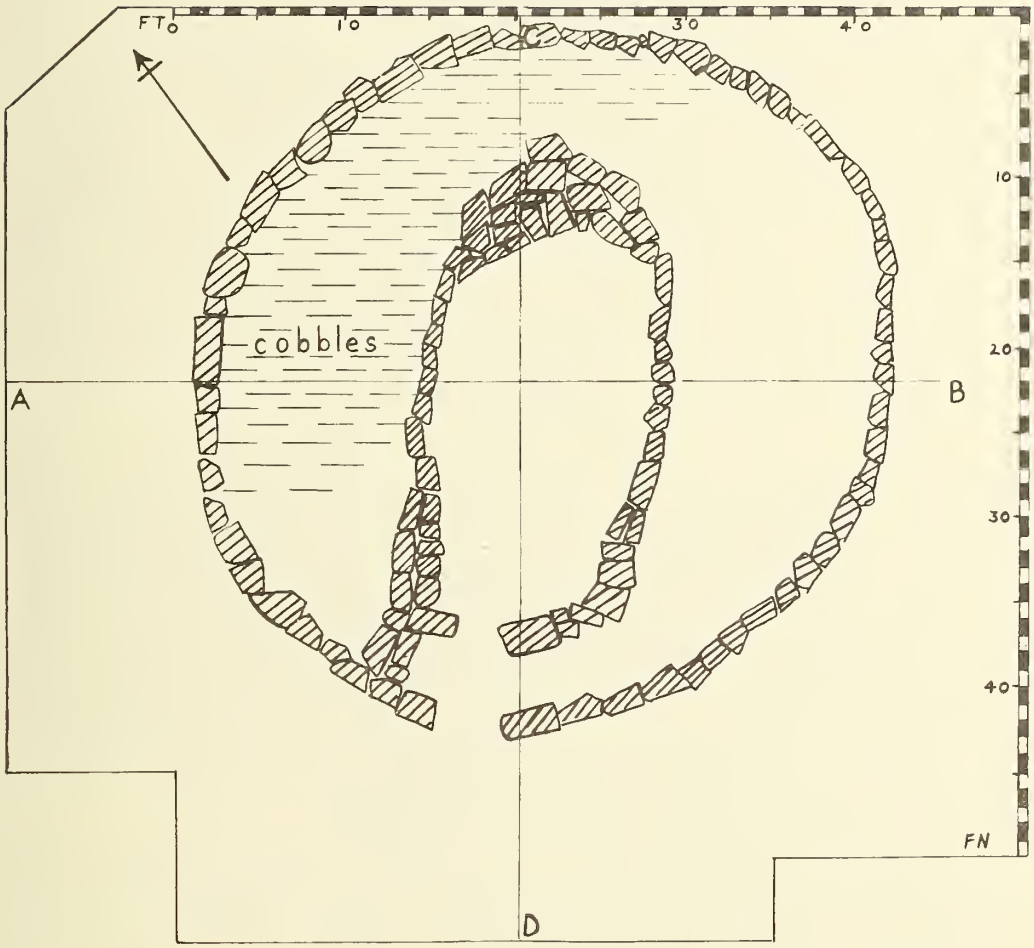


Fig. 1

Peristalith and Interior Kerb

and west, and on each side of the south-facing entrance. It is possible that this outline was imposed by the pre-existence or pre-erection of an inner enclosure or chamber with entrance aligned with that of the cairn, and set back some 3 ft. 6 inches from it. This chamber measured 23 ft. 6 inches north-south by 12 ft. 6 inches east-west internally, but unlike the cairn was enclosed only partly by a single stone kerb. At rear especially an extremely compact and heavy boulder build increased the kerb width to a maximum 6 ft. while towards the entrance, on either side, the kerb thickness was increased, by the use of larger boulders, or of two side by side. The entrance also was marked by more massive blocks (*Note 6*). This feature considered together with the wide rear kerb, built just on the edge of the natural slope, might indicate that the structure was at one time free standing. Nevertheless, as the bulldozer clearly showed in shearing at right angles to the chamber, the same black pre-cairn humus passed beneath chamber and cairn alike. Circumstances scarcely allowed of close scrutiny.

One feature was patent; that the space between cairn and chamber was closed by a "cross wall" on the west side of the entrance, and open on the east. Particular attention was paid to the peristalith which at least could be recorded with reasonable accuracy, and it is virtually certain that no boulders had ever barred the space between inner and outer kerbs to the east. Further, it was recorded, unfortunately after destruction had proceeded some way, that over the dark humus the space between kerbs on the west and round the north-east was completely cobbled. Cobbling probably completely filled the "corridor" on the west and round the north, but it is certain that the space on the east was void of cobbling.

Finally the cairn itself was composed largely of stones in brown earth not dissimilar to the glacial till of the area, but, if anything, somewhat darker and interspersed with dark streaks, perhaps caused by tree roots and animal burrows. It was quite impossible to attempt to plan such, or to detect any tip lines. Nor in the main body of the cairn was any change noted in the density, in size or compactness, of the large stone content.

In the case of the chamber however, although no horizon was accurately planned, the fill was much darker, and for the rear two-thirds, almost entirely of stones, compacted in dark earth. This was noticeably stiffer near the centre. In the fore third however, cairn material appeared to descend into the chamber. There was no trace of cist, urn or interment. The many bones found within the cairn were recent, scarcely yellowed by contact with the acid soil, and attributable to the foxes.

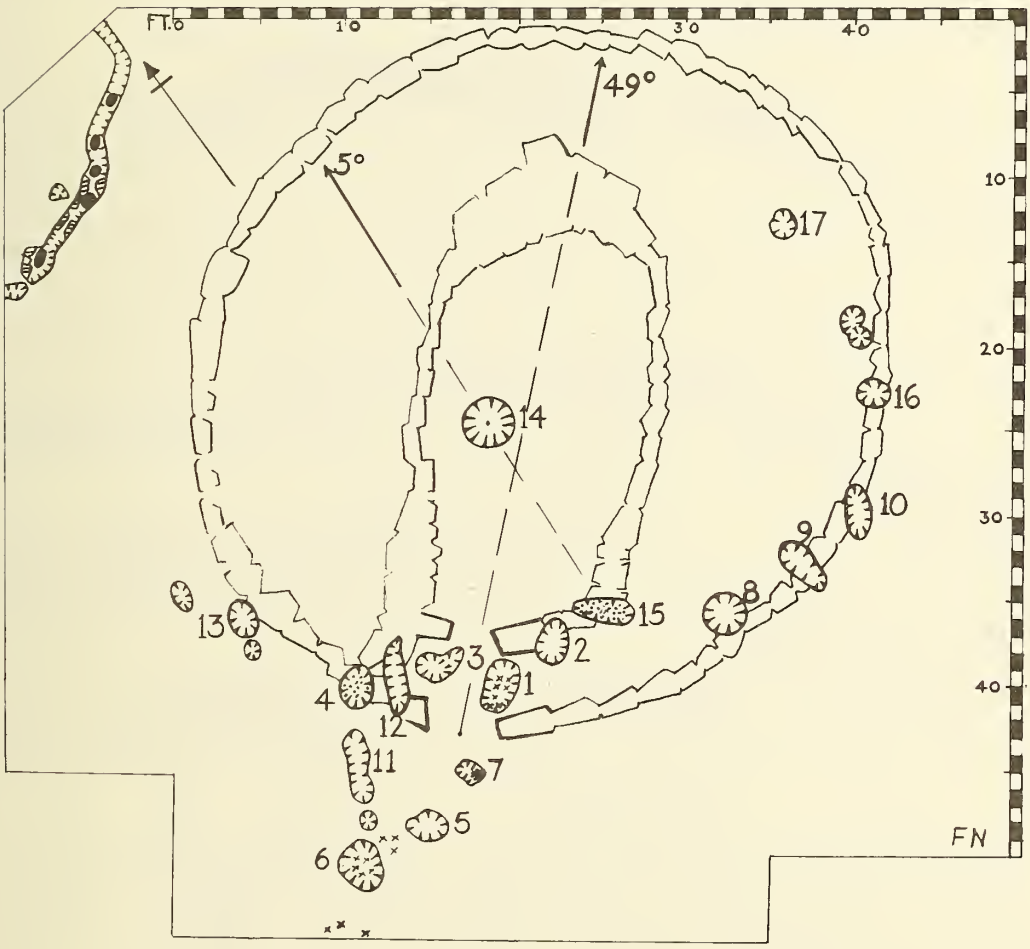


Fig. 2

Pre-Cairn features
(Cairn and Chamber outline indicated)

Pits 1,6 - Sherds. Pit 4 - Cremation.
Pits 7,15 - Charcoal.

A possibly similar cairn with contained chamber, much denuded, located at the foot of Glentane Hill, NS224519, is illustrated in *Fig. 3*. Here the axis is almost due east-west (*Note 7*).

THE PRE-CAIRN AREA

Apart from pits Nos. 1-3 and 14, which were exposed by the bulldozer, all other pits lay beneath the black layer and it is almost certain that in fact all pits were contemporary and of ritual significance. They are numbered in the order in which they were cleaned out. Except for those to be described, most contained a dark humus-like earth, but Nos. 11, 12, and 14 were filled with a grey clayey earth. They varied in depth from 10 inches to 5 inches, with a few minor depressions, not numbered, scarcely deeper than 3 inches. Nos. 8, 9, 10, 14, 16 and 17 were cut into the rock.

Pits 1, 4, 6, 7, 15 and 14 appear to have significance in themselves, albeit but members of a complex. Apart from Nos 8 and 14, the majority were elongated (*Note 8*).

Pit 1 (*Fig. 3*). Filled with dark grey earth surfaced with a drift of till, this pit contained 22 small sherds of a fine vessel of smooth buff coated dark ware, not unlike a food vessel lacking decoration.

Pit 4. Bowl shaped, c. 8 inches deep, this pit 2-2½ ft. across, contained a mass of charcoal and numerous small cremated animal bones, the majority reduced to mere powdery white granules.

Pit 6. Bowl shaped, some 8 inches deep and 2½ to 2¾ ft. across, this contained 8 sherds of a rough, thick, reddish-surfaced, heavy urn. From the ground between it and pit 5 came 3 further sherds of fine ware similar to that from pit 1, while from the surface to the south of the pits came another sherd of rough ware and 2 of finer ware.

Pit 7 (*Fig. 3*). This pit held at bottom a large stone over which, and rising to the surface of the pit on its west side, was a stiff fill of pink clay impregnated with carbonised wood. To the east side dark earth descended in a pocket within the pit.

Pit 15. An elongated basin some 5 inches deep, beneath a topping of dark earth, was choked with charcoal.

Pit 14. This pit, circular, bowl shaped, c. 1 ft. deep, with content similar to Nos. 11 and 12, fits the pattern of the pit complex, being off centre in relation to cairn and chamber (*Note 9*).

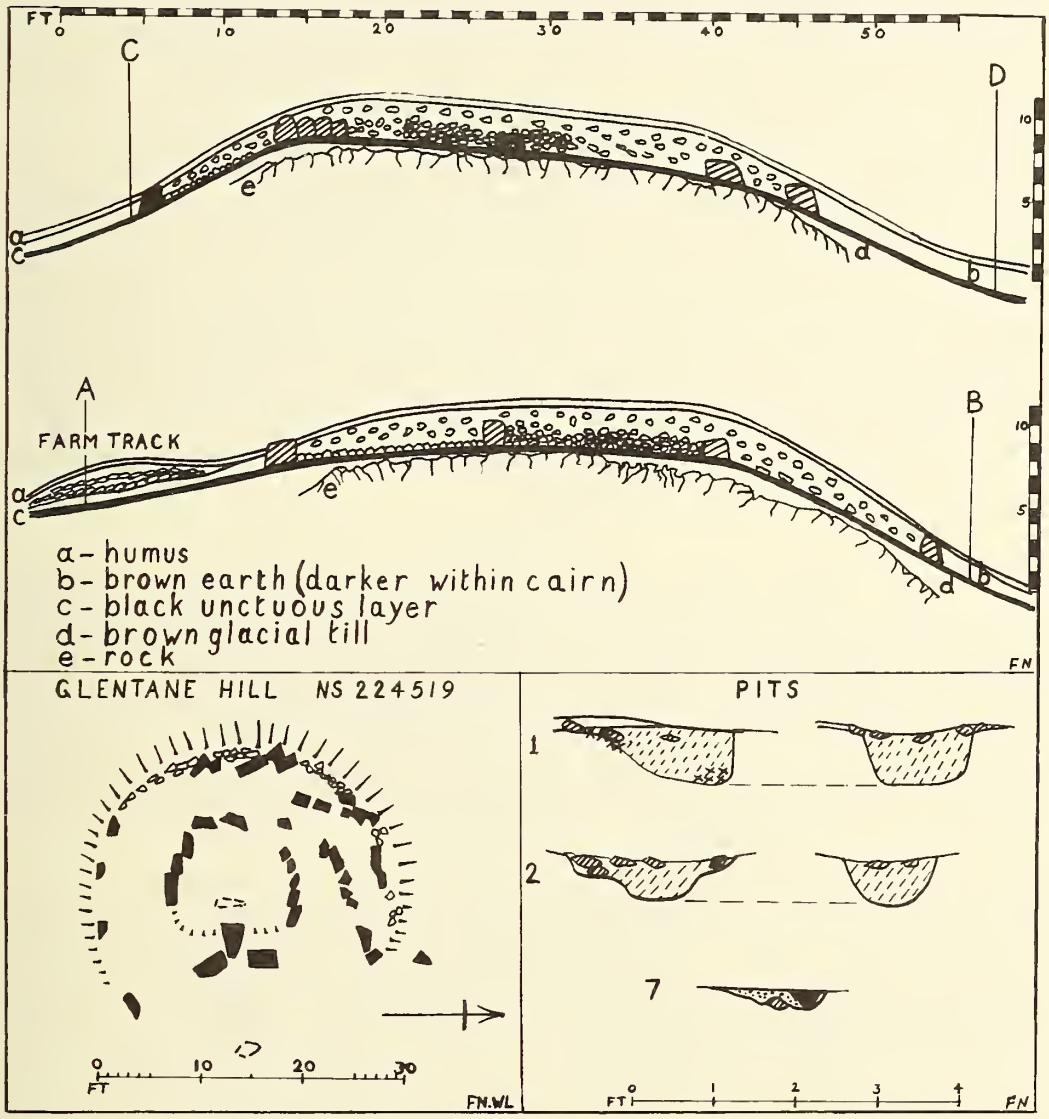


Fig. 3

Sections and Pits

ENCLOSURE?

To the immediate north west of the cairn, downslope the pre-cairn humus was liberally interspersed with carbonised twig fragments, and as the layer was trowelled away these were found to descend in dark earth into a sinuous shallow linear depression varying from 1 ft. to 2 ft. wide, and little more than 4 inches deep, but with pockets of charcoal penetrating a few inches deeper. The filling throughout was dark grey earth, and the charcoal appeared to penetrate from the pre-cairn humus. The depression concluded in a slightly deeper pit containing one of the pockets of charcoal. Five feet from this was the only depression, fully 1 ft. deep, which might be termed post hole. The southern half of the depression was edged sporadically with stones. To the north, and to the west, where a further depression appeared in line, the feature passed beyond limits into the neighbouring field, beneath a metalled track. Whether it outlined a hut, a mortuary house, or was merely a prehistoric animal burrow was not determined.

FINDS

Apart from the sherds already described, the pre-cairn level produced one flake of flint, and two struck fragments of quartz, one showing traces of percussion granulation at the edge, and perhaps detached from a hammer stone. The total of finds concluded with a sherd of mediaeval pottery from the edge of the site in plough-disturbed soil. Numerous similar sherds have been recovered from the area, possibly due to the proximity of Duchal Castle (*Note 10*).

When first located the finer pottery was considered to be possibly from an undecorated zone of a food vessel. Mr. Jack Scott however had an opportunity to examine the finds and reported that "all the pottery is prehistoric, and possibly Bronze Age. The sherds from pit 6 are from a very coarse, ill baked vessel, strongly reminiscent of a Cinerary Urn. The sherds from pit 1 are rather finer in fabric, but still represent very coarse ware, again Cinerary Urn in type rather than Food Vessel, though there are one or two sherds which are thin enough to be Food Vessel. The quartz fragments might or might not have been used as implements. The Mediaeval sherd has a good rich glaze, and might be 13th - 14th century".

DISCUSSION

The purpose of the cairn is doubtful. Barren of finds it has, perhaps, a ritual or commemorative significance. As the pits were already covered by vegetation when it was erected, only if posts rose above ground could the ritual site have been

marked. Posts may have risen from pits 7 and 15. If so, the cairn may have been erected over a known sacred site, although it failed to coincide precisely with it. Further the axes of the sites may have significance if they were aligned on an accepted heavenly body.

The pits form a rough semicircle inbowed towards pit 15, with a few pits lying beyond to the south-west. Pit 14 may be accepted as central to this disposition. An axis assumed from pit 15 to pit 14 lies 4 degrees east of north. But the cairn axis lies 49 degrees east of north, a difference of 45 degrees (*Note 11*).

What solar or astral connection, if any, may be inferred we leave to the astronomer. The cairn indeed may be central to other structures as yet undetected. A very rough dating c. 1500-1000 B.C. is as close as the evidence warrants for the active use of the site.

Footnotes

Note 1. *The Western Naturalist,* Vol. 1, 1972: 50-2.

Note 2. *Discovery and Excavation Scotland,* 1956: 22. Two other mounds noted there are now known to be natural. Five polished stone axes have been recovered from the surrounding fields.

Note 3. The cairn faces almost north east, but for convenience, the datum fence to the west, almost parallel to the axis, is presumed to run north-south.

Note 4. Mainly by the writer and Alastair S. Newall. Messrs William Black, Gordon McCrae, Gordon Todd and David Newall assisted occasionally.

Note 5. NEWALL, F. *Excavations of Prehistoric and Mediaeval Homesteads at Knapps, Houston.* (Paisley Museum, 1965) page 5.

Note 6. The heaviest blocks used in construction measured 4 ft. x 1½ ft. x 2 ft. high. These now form a stone fence at the farm cottage which occupies the site.

Note 7. *Discovery and Excavation Scotland,* 1965: 15. Located and planned by Dr. William Lonie and the writer, from surface indications.

Note 8. Cf. NEWALL, F. Knapps, Op. Cit. Supra, p. 21.

Note 9. All finds including samples of bone and charcoal, and the flint and stone collections from Lawpark and East Green have been presented to Paisley Museum.

Note 10. *Discovery and Excavation Scotland,* 1961: 43,44; 1964: 46; 1966: 40; 1967: 46; 1968: 40; 1969: 44; 1970: 45. Collected chiefly by William O. Black, from East Green farm; the majority have been presented to Paisley Museum.

Note 11. As all offsets had to be judged by eye, and as no levels could be taken during the measurement of the cairn outline one hundred per cent accuracy cannot be claimed. Nevertheless the fairly massive construction renders it extremely unlikely that the axis is far from its true position. Accuracy to at least three degrees is probable.

Mr. Frank Newall, Ferniebank, Kilmacolm, Renfrewshire.

ZOOLOGICAL NOTES

COMMON SHREW ON THE ISLAND OF SANDA, KINTYRE

In August 1972 Mr. John Mitchell, of the Nature Conservancy, and Mr. R.G. Nisbet, of Kelvingrove Museum, Glasgow, while staying on the Island of Sanda for a few days, found a single specimen of the Common Shrew *Sorex araneus* which had been caught by one of the farm cats on the 27th. The shrew was subsequently examined by Mr. Carmen Placido, also of the Nature Conservancy, who prepared the specimen, and the skull has very kindly been passed on to me.

Examination of the teeth, and the size of the lower mandible (11.5mm) leave no doubt that it is a specimen of the Common Shrew and not the Pygmy Shrew *Sorex minutus* which is, of course, common on Sanda and many of the other Clyde islands. The measurements and teeth configuration have been carefully checked by Mr. Mitchell and Mr. Placido and myself.

Throughout the mainland part of the Clyde faunal area the Common Shrew and the Pygmy Shrew occur commonly together in close association, and both species are commonly found on the large Clyde islands of Arran, Bute and Cumbrae; on the small Clyde islands, however, only the Pygmy Shrew has so far been known to occur. In 1954 I pointed this out in my paper on the mammals of the Clyde area (*Trans. Paisley Nat. Soc.*, 6: 1-46), and to the best of my knowledge this was the first time that this island distribution relationship between the two shrews had been noted.

The Pygmy Shrew occurs commonly on Sanda, Ailsa Craig, Holy Island, Inchmarnock and little Cumbrae, but this is the first time that a Common Shrew has been reported from any small Clyde island (an earlier record from Sanda in the *Glasgow Naturalist*, Vol. 18: 17, was an obvious error, which would have been avoided had its significance been realised), so this discovery is extremely important.

During the past few years, however, there has been considerably increased farming activity on Sanda and a large amount of straw has been imported in bales, so it seems almost certain that this Common Shrew was an accidental importation in the straw. It seems very unlikely, however, that a farm cat could catch the only specimen of Common Shrew on the island, so it is probable that several were imported and that a breeding population may well become established. Live trapping will be continued over the next few years to investigate the position, and further developments will be reported.

J.A. Gibson

FOX ON ISLAND OF ARRAN

We hear from Lady Jean Fforde and Mr. Howard Walker, head gamekeeper, that in early June 1973 a Fox *Vulpes vulpes* was accidentally killed on the road near Sannox in the northern part of the Island of Arran. The Fox was apparently an adult, but how it reached Arran is as yet unknown, although the assumption is that it was a semi-tame creature which had been smuggled on to the island and had then escaped. To the best of our knowledge no further records of Foxes have been reported.

INCREASED FOX BOUNTIES IN KINTYRE

As a follow-up to the Kintyre Fox article (*Western Nat.*, 1: 111-113) readers might be interested in the following paragraph which appeared in the *Campbeltown Courier* for 24th May 1973: "At a recent meeting of the Kintyre Fox Hunting Society, when Captain J. Maxwell Macdonald presided, members suggested that foxes in Kintyre were fewer in number than for some years. This was also indicated by the smaller number of adults and cubs accounted for in the past year. To take advantage of this situation, the committee recommended a proposal that bonuses be increased to three pounds for an adult fox and one pound for a cub".

Duncan Colville

GREY SEALS BREEDING IN THE CLYDE AREA

The Grey Seal *Halichoerus grypus* has been known to occur sporadically in the Clyde area for over a century; it has been reasonably common around the shores of south Argyll for some fifty years; and there has been a well-known fairly large gathering of Grey Seals on the east Cowal shore above Toward since at least the late 1930s. Despite this, however, the Grey Seal has never been known as a Clyde breeding species, and indeed in my Clyde mammal paper of 1954 (*Trans. Paisley Nat. Soc.*, 6: 1-46) I was only able to give one instance of a Grey Seal pup being found on land adjoining the Clyde - at Ronachan on the west coast of Kintyre in October 1943.

Later Dr. J. Morton Boyd reported a probable Grey Seal pup on the Little Cumbrae in November 1958: "Mr. R. MacCuish found a 'cream coloured calf' born on Little Cumbrae, Bute in Mid-November and another, probably the same animal, was seen there by the skipper of F.R.V. *Calanus* during that month" (*Proc. Zool. Soc. Lond.*, 138: 390). This, to the best of my knowledge, was the first published record from within the Clyde faunal area.

I am glad to report, however, that within the past few years there has been a significant increase in the Grey Seal population of the Clyde. Grey Seals are now commonly seen on and around Ailsa Craig, at the south end of the Island of Arran, and have been breeding on Holy Island since 1969. This island is now the property of the Universities Federation for Animal Welfare (U F.A.W.) and in the U.F.A.W. *Annual Report* for 1971-72, page 7, it is stated that four pups were observed in 1971 and that "all the pups survived to go to sea"; since then several other pups have apparently been successfully reared. Common Seals, of course, have been well-known around the shores of Holy Island for very many years, and have bred from time to time. Efforts are being made by U.F.A.W., to ensure that the seals' breeding ground remains undisturbed so there would seem to be every possibility that the Grey Seal will become firmly established as a Clyde breeding species. J.A. Gibson

GOATS ON THE ISLAND OF SANDA, KINTYRE

In my paper on the Wild Goats of the Clyde area (*Western Nat.*, 1: 6-25) I quoted a passage from Lord Archibald Campbell's book *Records of Argyll* (1885) which said that Sir William Cunningham had introduced Goats to Sanda, but at the time I was unable to give an accurate date for the introduction. Since then, however, I have been able to obtain further details from two sources - Mr. Andrew McKerral's manuscript on the parish of Southend in the library of the Kintyre Antiquarian and Natural History Society, and the late Sheriff McMaster Campbell's lecture on the *Island and House of Sanda* read to the Kintyre Society on 13th November 1924 and later reprinted in the *Campbeltown Courier*. Slightly paraphrasing these two sources, the information I have obtained is as follows:

"The Archibald Macdonald who sold the estate of Sanda would appear to have been a grandson of the Archibald who married Helen Cunningham, daughter of John Cunningham of Hill of Beith, in 1699 or 1698. This Archibald Macdonald was an advocate at the Scottish Bar, who died unmarried in 1796, and it was during his incumbency that the family fortunes underwent a decline.

In the year 1785 Archibald Macdonald gave two bonds of £2000 each to Donald Campbell of Glensaddell and Donald Macdonald of Balishare, both of whom were at the time seised in parts of the St. Ninian's lands as security for the loans. He may have been acting for his father at this date, if the latter died in 1786. It is clear in any case that it was in his time that the Macharioch estate passed out of the hands of the Macdonalds of Sanda and into those of the Macdonalds of Balishare, the

latter coming into complete and sole possession of it by a decree of sale and adjudication dated 9th July 1799.

The Macdonalds of Balishare did not purchase the farm of Gartnacopaig nor the Island of Sanda, and in 1799 these were sold to Major-General Dugald Campbell of the East India Company's service, who four (or fourteen) years later sold them to Sir William Cunningham of Fairlie and Robertland, the then representative of an ancient Ayrshire family. Sir William obtained sole possession of Sanda and Gartnacopaig on 27th October 1803 (or 1813), and it was he who stocked the island 'with fallow deer, stags, and roes, together with a large breed of white goats from Ireland'. Whether this innovation was made for ornamental or commercial purposes, it is not difficult to apprehend that the experiment was not successful, and that on the sale of Sanda and Gartnacopaig in 1825 the Island was restored to its previous use, the tillage of the small area of cultivable land and the grazing of sheep.

On 31st December 1825 Sanda and Gartnacopaig were purchased back by the Macdonalds, and it is pleasing to note that the purchaser was the then representative of the house of Sanda, the Rev. William Macdonald, Archdeacon of Wilts and Canon of Salisbury Cathedral".

The exact date of the sale of Sanda and Gartnacopaig appears to be in some doubt, although the year 1803 is the more likely to be correct. What is clear, however, is that the Goats were on the island of Sanda some time during the first quarter of the 19th century. I am grateful to Mr. Angus MacVicar of Southend and Mr. Duncan Colville of Machrihanish for drawing my attention to these two additional sources of information. J.A. Gibson

SOAY SHEEP AND BADGERS ON HOLY ISLAND, ARRAN

West of Scotland naturalists may be interested to hear that Soay Sheep *Ovis aries* and Badgers *Meles meles* have recently been introduced to Holy Island by the Universities Federation for Animal Welfare (U.F.A.W.), who now own the island.

Commercial grazing of sheep on Holy Island came to an end in July 1970, when the existing sheep were removed. They were replaced on 5th August 1970 by fifteen Soay Sheep (two males, thirteen females), obtained from Fife and Caithness through the good offices of the Royal (Dick) Veterinary School, Edinburgh, and were the direct descendents of sheep which were brought from the Island of Soay at the time of the evacuation of St. Kilda in 1930. In July 1972 five more Soay Sheep (one male, three females and a lamb) were added. Although the two groups of Soays

have tended to keep separate, successful breeding has taken place, and in June 1973 the total population consisted of four males, twenty-two females and five lambs (U.F.A.W. *Annual Report*, 1972-73: 27-29). Soay Sheep were introduced to Ailsa Craig shortly after the evacuation of St. Kilda, and bred successfully for many years, ultimately achieving a herd of over 150 beasts, but have now died out (*Trans. Buteshire Nat. Hist. Soc.*, 17: 73-76, 18: 51). As far as I know, therefore, the Holy Island Soays are now the only free-ranging Soay Sheep in the Clyde area.

In spring 1971 a male and female Badger (saved by U.F.A.W. from destruction in the south of England) were released on Holy Island, and after a period of rehabilitation appear to have settled in well. It remains to be seen whether successful breeding takes place. Apart from the Island of Bute, from where there are some very old possible records in John Blain's *History* of 1820, the Badger appears to be a native of no Clyde island. Badgers, however, were introduced to Arran around 1895 and are still established on the island in small numbers. Badgers were also introduced to Ailsa Craig in 1876, and bred successfully for some years, but had died out by about 1890. In my paper on Bute mammals (*Trans. Buteshire Nat. Hist. Soc.*, 18: 5-20) I could give no current records of Badgers on Bute; recently, however, there have been two instances of Badgers being found on Bute, and these are at present under investigation.

J.A. Gibson

RED-NECKED GREBE AT CARMUNNOCK, LANARKSHIRE

On 6th May 1972 a Red-necked Grebe *Podiceps griseigena* in breeding plumage was seen at High Dam, Carmunnock, Lanarkshire (NS624573). The following identification features were clearly noted using x 10 binoculars: yellow base to bill, black crown, pale grey cheeks, chestnut neck and grey-brown upper parts. Photographs were taken. The bird was also heard calling with neck extended forward low over the water. This is an unusual record because of the locality and the date. The bird was not there the following day. R.M.C. Lambie, D. Lambie, J. Anderson

GANNETS' UNUSUAL NESTING MATERIAL

In 1951 I published a list of freak nesting materials utilised by Gannets *Sula bassana* on Ailsa Craig which had been found by myself and the late Mr. James Girvan, tenant of the Craig

(*Scot. Nat.*, 63: 193). Within the past ten years, however, I have noticed that pieces of the bright orange nylon rope, commonly used by fishermen, are occasionally used by Gannets as nesting material.

I have now found pieces of this rope in at least forty nests, and have seen Gannets carrying this orange nylon rope on three occasions. The longest piece I found in a nest measured just under three feet, but I once saw two Gannets on the sea having a tug-of-war over a length of this rope. Unfortunately the birds got disturbed and flew off, so I did not see the end of the affair. It would have been interesting to see how the Gannet dealt with what was apparently a substantial length of rope. On one occasion I also found a section of the orange nylon netting, as used in lobster creels, in a nest; a young Gannet was considerably entangled in the netting and it took me several minutes work to get it free.

In my experience this orange nylon rope is exceptionally strong and is not likely to get broken up by the action of the sea. Indeed, all pieces I have been able to examine in Gannets' nests have had clean-cut edges, and were not frayed. Presumably these represented remnants or useless ends of rope which were cut off and thrown overboard, to float around, possibly for ever, until washed ashore or picked up.

I shall be interested to hear if other observers have any similar records. J.A. Gibson

NYLON ROPE IN SHAGS' NESTS

As a follow-up to the above note, it is worth recording that I have twice found a piece of this orange nylon rope entwined through the seaweed of a Shag's nest. In my experience the Shag *Phalacrocorax aristotelis* does not usually collect rubbish, so the rope may have been picked up accidentally along with the seaweed. J.A. Gibson

'NEST LEDGE' DISPLAY OF THE PEREGRINE FALCON

The 'nest ledge' or 'shelf' display of the Peregrine Falcon *Falco peregrinus*, vividly described by J.A. Hagar for the sub-species *F.p. anatum* in Brent's *Life Histories of North American Birds of Prey* (1937-38), appears to have been little recorded in the British Isles. Courtship display prior to egg-laying normally takes place during March, but probably due to the late occupation of a traditional West Stirlingshire site by a new pair of Peregrines, the following observations were made

on 9th April (1973).

Watched by the female from a stance near the top of the cliff, the male repeatedly flew from ledge to ledge, momentarily crouching on each and calling enticingly with a creaky *eee-yerrrk, eee-yerrrk, eee-yerrrk.* The female frequently responded in similar voice, but only once flew down to join the male briefly on one of the ledges. At this, both birds became extremely excited and their drawn-out calls changed to an abrupt repeated *whee-chuck* as they shuffled to the back of the ledge. The display lasted no more than five minutes, during which time the male had alighted on several known nest ledges of previous years.

At the next visit on 26th April, one of the former nest ledges was found to have two fresh 'bowls' scraped in the earth, but the ledge chosen by the female for the eggs was one in which the male had shown only a passing interest during the display.

J. Mitchell

PEREGRINES AND PESTICIDES ON THE ISLAND OF BUTE

In 'The Status of the Peregrine in Great Britain' (*Bird Study,* 10: 56-90, 1963) and subsequent papers, Dr. D.A. Ratcliffe presented convincing evidence to connect a decline in Peregrine Falcon *Falco peregrinus* numbers and breeding success with the post-war use of organochlorine agricultural pesticides. These substances are very soluble in fat, and residues were traced in both the birds and their eggs. Amongst the most frequent of the pesticide residues found were DDE, the principal metabolite (break-down product) of DDT, and dieldrin - not only a metabolite of aldrin, but a very toxic insecticide in its own right. From 1967, Peregrine corpes and eggs were also analysed for polychlorinated biphenyls (PCBs), by-products of the industrial production of plastics and commonly found as pollutants in the marine environment.

In order to monitor the levels of contamination, a small number of fresh and addled Peregrine eggs were collected under licence each year for chemical analysis. In May 1971 a Peregrine's egg which failed to hatch was collected by the writer from an eyrie on the island of Bute, the pair rearing only one young from an original clutch of three eggs (one egg disappeared during incubation). The contents of the egg were analysed for chemical residues by the Laboratory of the Government Chemist on behalf of the Nature Conservancy's Toxic Chemicals and Wildlife Section at Monks Wood Experimental Station, the results below being expressed in parts per million (ppm) wet weight. For comparison, the mean chemical residue figures for 1967 and 1971 have been taken from Ratcliffe (1972) 'The Peregrine Population of

Great Britain in 1971' (*Bird Study*, 19: 117-156) and are shown in brackets:

DDE: 6.0 (10.1) ppm

A 'background' level of DDE residues now frequently found in predatory birds and their eggs. However, even low residue levels have shown to affect calcium metabolism in birds and may be responsible for the post-war phenomenon of 'egg-shell thinning', rendering eggs more prone to accidental breakage in the nest.

Dieldrin: 3.0 (0.7) ppm

One of the highest levels of dieldrin residues ever found in a British Peregrine's egg. This is unexpected from a marginal farming area, and where observations suggest the pair were relatively sedentary.

PCBs: 3.0 (1.0) ppm

A higher level of PCBs than average, but not unusual for a coastal Peregrine site, particularly as the pair were recorded feeding partly on sea-birds.

With the possible exception of dieldrin, the individual residue levels were probably not critically high. However, the additive effect of the organochlorine pesticide residues with PCBs is unknown, and it is possible that their combined level of contamination may have been responsible for the failure of the egg.

Ian Hopkins

QUAIL AT CARMUNNOCK, LANARKSHIRE

On 16th June 1973 a Quail *Coturnix coturnix* was heard calling at the High Dam Marsh, Carmunnock, Lanarkshire (NS620574). The bird was first heard in the afternoon, and again in the evening when a tape-recording of its call was made. The site was visited the following day but no further calling was heard.

W. Cummings, R.M.C. Lambie, J. Anderson

THE DECLINE OF THE WHEATEAR ON THE ISLAND OF SANDA, KINTYRE

The fluctuation which can occur in an isolated population of Wheatears *Oenanthe oenanthe* was illustrated by Williamson (1964) in 'Land Birds on St. Kilda' (*Bird Study*, 11: 153-167). Islands form ideal census areas for the study of population

changes, and the following account describes a recent decline in the number of breeding Wheatears on Sanda, 1½ miles off the south-east coast of Kintyre.

The results of an ornithological census carried out on Sanda (345.6 acres) in June 1951 are given by Borland and Walls (1951) in 'Notes on the Birds of Sanda Island' (*Scot. Nat.*, 63: 178-182). Well over 100 pairs were estimated, almost all feeding young. Between 1st and 4th June 1973, counts of selected species on Sanda were undertaken by the writer and three other members of the Scottish Ornithologists' Club. On this occasion only two pairs of Wheatears were recorded. A major decline in the number of Wheatears has not been reported elsewhere in the West of Scotland, so the situation on Sanda suggests that one cause may be localised habitat change.

At the time of the first census, the island was intensively grazed by about three hundred sheep and a small herd of cattle. With a change of ownership some three or four years prior to the repeat census, the cattle were removed and the number of sheep reduced by two-thirds. Except where limited areas have been periodically burnt, the reduction in grazing pressure has resulted in an accumulation of several seasons' growth of long grass and other vegetation. The considerable decrease in the number of breeding Wheatears on Sanda may parallel an earlier decline reported from some parts of southern England, where a substantial reduction in the Rabbit population (caused by myxomatosis) led to rapid growth of vegetation cover, unfavourable to this characteristic bird of exposed bare habitats. J. Mitchell

SISKINS NESTING AT CARRADALE, KINTYRE

In 1973 I saw adults and newly fledged young Siskins *Carduelis spinus* in my garden at Carradale; they were seen at close quarters on many occasions. In 1972 Siskins were seen regularly and I strongly suspected that they were breeding, but was unable to obtain proof. M.R. McKeand

(Mrs. McKeand, wife of the Head Forester, came to Carradale in 1972. She is an enthusiastic ornithologist, and has a large picture window in her kitchen with a positive battery of bird feeders just outside. We were very impressed at the remarkable opportunities for very close observation which this situation gave, and there is no doubt about the accuracy of her observations.

The Siskin is fairly well-known in the wooded north-eastern strip of Kintyre, but confirmation of breeding is difficult to obtain, so this note is doubly welcome. - Editors).

SOCIETY NEWS

H.R.H. THE PRINCE PHILIP AT SCOTTISH WILDLIFE TRUST DINNER IN GLASGOW

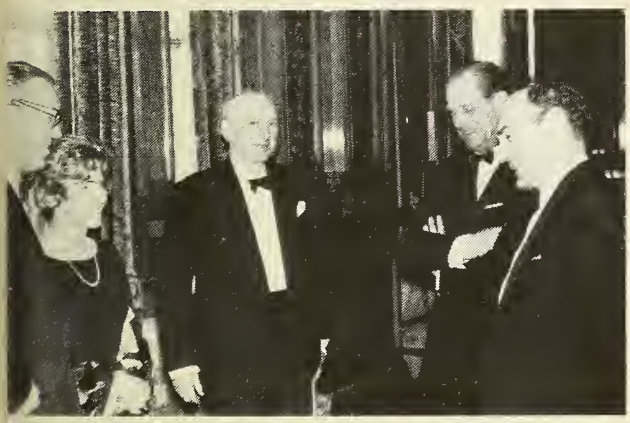
By JOHN M. FINDLAY
Honorary Secretary, Clyde Area Branch, Scottish Wildlife Trust

One of the biggest wildlife/conservation events ever to be held in this country took place on Thursday 17th May 1973, when H.R.H. The Prince Philip, Duke of Edinburgh was principal guest at the fund-raising dinner of the Scottish Wildlife Trust held in the City Chambers, Glasgow. Some 400 guests attended from all over the country, including Mr. William S. Gray, Lord Provost of the City of Glasgow, and the Lords Lieutenant of many counties throughout the West of Scotland. The dinner was an outstanding success and was described in the Press as "one of the most glittering social occasions for many years in the West of Scotland".

The Chairman at the dinner was Dr. J.A. Gibson, Chairman of the Clyde Area Branch of the Trust, and after a civic welcome by the Lord Provost, Dr. Gibson welcomed His Royal Highness on behalf of the Branch and the Trust. In proposing the toast of the Scottish Wildlife Trust His Royal Highness revealed an intimate knowledge of the work of the Trust, and particularly praised the Trust's efforts in setting up reserves to preserve areas of our own country, and in trying to reconcile all conflicting interests. Prince Philip expressed the view that Scotland had an opportunity to create something quite new in the way of a genuinely European wildlife area, where past and present native forms of wildlife could exist under natural conditions, and in such a way that they could be seen by large numbers of people. He maintained that one of the Trust's great values was that it was in a position to give help and advice to all the bodies and organisations which were either concerned about the countryside or whose plans and developments might have an impact on wildlife.

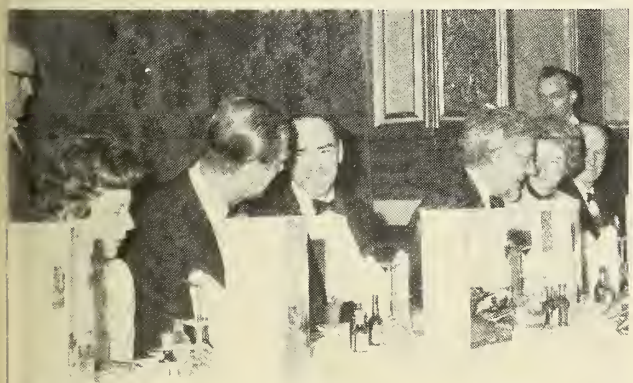
Replying to the toast, Sir Charles Connell, Chairman of the Trust's Council, emphasised that the Trust had to be eternally vigilant, so that no part of our national heritage was needlessly damaged or destroyed. Nevertheless it was important to emphasise that the Trust was not against development; everyone knew that Scottish industry must develop and expand. What we must try to ensure was that while the best use was made of Scotland's natural resources, we also preserved as much as possible of our wonderful natural heritage.

is Royal Highness proposing the toast to the Scottish Wildlife Trust. Viscount Muirshiel, Mrs J. A. Gibson, H.R.H. Prince Philip, Chairman Dr J. A. Gibson, the Lord Provost Mr William S. Gray.

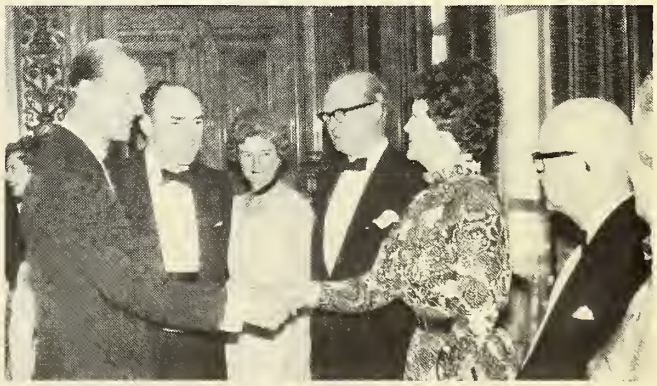


r David Stephen (President of the Clyde Branch) and rs Stephen, Sir Charles Connell (Chairman of Trust Council), Prince Philip and Dr J. A. Gibson.

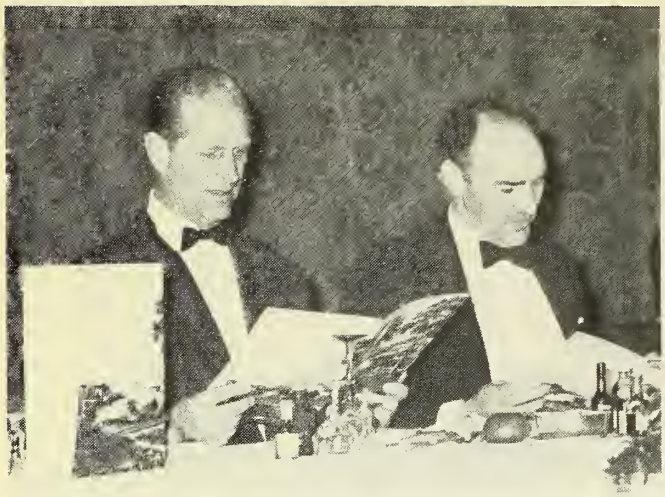
Prince Philip, Mrs Gibson and Mr J. Ian Waddington (Director, Clyde River Purification Board).



rs Gibson, H.R.H. Prince Philip, Dr J. A. Gibson, the Lord Provost, Mrs Waddington, Sir Charles Connell.

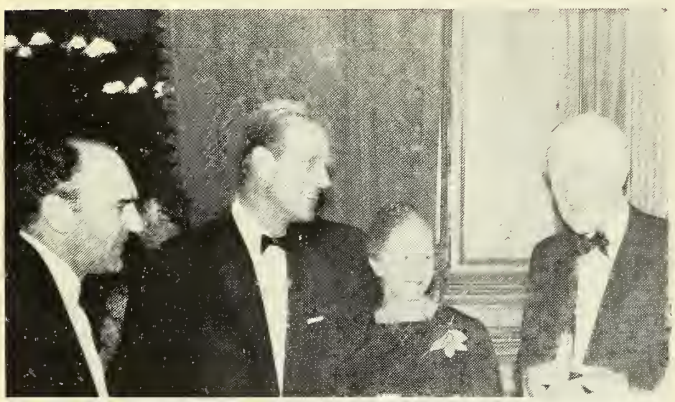


Mrs Gibson, Prince Philip, Dr J. A. Gibson, Mrs Waddington, Mr Bernard Preston (Vice-Chairman of Trust Council) and Mrs Preston, Mr John Findlay (Secretary of Clyde Branch) and Mrs Findlay.



H.R.H. Prince Philip and Chairman Dr Gibson examining the commemorative brochure.

Prince Philip, Dr Gibson, the Lord Provost Mr William Gray, Mrs Waddington and Sir Charles Connell.



Dr Gibson, Miss Aileen Ross, Prince Philip, Mrs Methven (Convener, Glasgow City Parks Department), and Viscount Muirshiel.

Prince Philip with Dr J. Morton Boyd (Scottish Directo of the Nature Conservancy) and Mrs Boyd.

Part of top table: Mr Maxwell Hamilton (Vice-Chairman of Trust Council), Mrs McNee (wife of the Chief Constable), M David Stephen, Mrs Preston, Lord Muirshiel, Mrs Gibson, Prince Philip, Dr J. A. Gibson, the Lord Provost, Mr Waddington, Sir Charles Connell, the Lady Provost, Mr James Lumsden (Chairman of Burmah Oil).

The appeal for funds was then made by the Rt. Hon. Viscount Muirshiel in his inimitable style. This appeal is already showing signs of considerable success, and an outstanding contribution on the night was a gift of five thousand pounds by Sir Hugh Fraser from the Fraser Trust. The vote of thanks was made by Mr. James A. Lumsden, Chairman of Burmah Oil, who well understood, and sympathised with, the conflicting interests between development and preservation.

In concluding the dinner, Dr. Gibson thanked the Duke for the honour he had bestowed on the Trust by his attendance, and then expressed everyone's gratitude to Sir Charles Connell for his wise leadership since the Trust was founded nearly 10 years ago; this well-deserved tribute was greeted with a standing ovation, and the dinner ended on this happy note.

Earlier in the evening Dr. and Mrs. Gibson had welcomed Prince Philip to a reception in the Satinwood Suite where informal presentations were made. Well-known conservationists present included Dr. J. Morton Boyd, Scottish Director of the Nature Conservancy, Mrs Jean Balfour, Chairman of the Countryside Commission for Scotland and Mr. John Foster, the Commission's Director, Mr. J.C. Stormonth Darling, Director of the National Trust for Scotland, Trust Vice-Chairmen Mr. J. Stewart Annand, Mr. Maxwell Hamilton and Mr. Bernard Preston, and the Director of the Clyde River Purification Board Mr. J. Ian Waddington, who was also Vice-Chairman at the dinner. With the aim of involving people who normally worked outside the conservation field, the guest list also included Mr. James A. Lumsden, Chairman of Burmah Oil, and other prominent industrialists such as Sir Hugh Fraser, Mr. Campbell Fraser of Lyon Holdings, and Sir Eric Yarrow.

To mark the occasion each guest at the dinner was presented with a commemorative brochure, which amongst other things contained many old engravings showing the River Clyde as it was some 150 years ago. His Royal Highness expressed considerable interest in this brochure and much praise was lavished on it by all present.

The Trust is extremely grateful to the Lord Provost and the Corporation of the City of Glasgow for their generosity in allowing the dinner to be held in the City Chambers, and a letter since received from Major Herman, the Duke's Equerry, said how much the Duke enjoyed the evening. It is certain that this dinner directed the attention of many eminent people in Scotland to the wide range of the work of the Trust, and gained considerable publicity for the cause of wildlife in Scotland. The benefits of this public relations exercise are already obvious and ultimately should be very far reaching.

REQUESTS FOR INFORMATION

FLORA OF SANDA ISLAND

Mr. John Mitchell, of the Nature Conservancy, and some colleagues have been visiting the Island of Sanda off the south-east tip of Kintyre within recent years, and are collecting details on the plant life of the island with a view to publishing a report. Anyone who may be able to assist in this project is asked to get in touch with Mr. Mitchell at 22 Muirpark Way, Drymen, by Glasgow, G63 ODX. All assistance received will be fully acknowledged.

CARRION/HOODED CROW HYBRID-ZONE ENQUIRY

Readers of the *Western Naturalist* are likely to be well-placed geographically to assist in the Carrion/Hooded Crow hybrid-zone enquiry. Many may already be assisting, but anyone else who feels able to help should contact Tony Cook, Edinburgh University, Zoology Department, West Mains Road, Edinburgh.

BIOLOGICAL STUDIES IN THE CLYDE ESTUARY

As mentioned in Volume One, staff and students at Paisley College of Technology are collaborating with staff members of the Clyde River Purification Board, the Nature Conservancy and others in studying the plants and animals of the Clyde estuary and will welcome any observations or records relating to the area, which may be sent to Dr. J.C. Smyth, Department of Biology, Paisley College of Technology, High Street, Paisley.

NATURAL HISTORY OF THE ISLAND OF ARRAN

Dr. J.A. Gibson is writing a book on the natural history of the Island of Arran. The book is being published by the Isle of Arran Tourist Association and will cover the vertebrate fauna: mammals, birds, reptiles, amphibians and fishes. In 1955 a small book on the birds was published; since then many changes have taken place and a supplement to the bird book is in the press. Papers on the mammals, reptiles and amphibians of the island have recently appeared in Volumes 17 and 18 of the Transactions of the Buteshire Natural History Society. These remain the main sources of information on Arran vertebrates and anyone who is able to assist, particularly with information additional to that which has already been published, is asked to get in touch with Dr. Gibson at Foremount House, Kilbarchan, Renfrewshire. Records of any unusual fishes taken off-shore in Arran waters will be particularly useful. Full acknowledgement of all assistance received will be made when the book is published.

THE RENFREWSHIRE NATURAL HISTORY SOCIETY

Founded 1847

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The Renfrewshire Natural History Society is the oldest Natural History and Antiquarian society in the West of Scotland. It was founded by the late Morris Young F.E.S. on 18th December 1847, and is now one of the oldest County Learned Societies in Great Britain.

The Society deals with all aspects of the history, natural history, archaeology and antiquities of the county of Renfrewshire, and its general interests extend over the whole of the West of Scotland. Either directly or through members it is affiliated to most major natural history and archaeological organisations in the British Isles.

The Society meets regularly for lectures and discussions during the winter months, and during summer field meetings are arranged to places of natural history or archaeological interest. The Society publishes the *Western Naturalist*, periodical *Proceedings*, and a regular newsletter. All publications, including the *Western Naturalist*, are sent to members free of charge.

The annual subscription for full membership is one pound. Over 65, juniors, students, and family members: 25p.

Applications for membership should be made to the Secretary.

THE WESTERN NATURALIST

Volume Two December 1973

CONTENTS

Editorial 3

The Reptiles and Amphibians of Renfrewshire
Dr. J.A. Gibson 4

Bird Communities of the Mainland Section of Loch Lomond National Nature Reserve
Mr. Kenneth Williamson, Mr. E.T. Idle and Mr. J. Mitchell 15

Spiders and Phalangids of Inchcailloch, Loch Lomond
Dr. D.J. Curtis 29

The Distribution of Voles on the Clyde Islands
Dr. J.A. Gibson 40

Natterer's Bat *Myotis nattereri* in Stirlingshire
Mr. Carmen Placido 45

Notes on Two Winter Roosts of Daubenton's Bats near Wanlockhead, Dumfriesshire
Mr. W.S. Harvey 46

The Fauna of Some Rocky Shores in the Clyde Estuary
Dr. J.C. Smyth 53

A Preliminary Survey of the Intertidal Benthic Algae of the Clyde Estuary
Dr. Martin Wilkinson 59

Record Trout in Upper Clyde
Mr. J. Ian Waddington 70

Some Observations on Scavenging of Salmon *Salmo salar* Carrion
Mr. J.H. Cuthbert 72

The Freshwater Fishes of Kintyre
Dr. J.A. Gibson and Mr. D. Colville 75

Notes on the Marine Fishes of Kintyre
Dr. J.A. Gibson, Mr. D. Colville and Mr. J.C. Gemmell 84

Destruction of a Bronze Age Cairn on East Green Farm, Kilmacolm
Mr. Frank Newall 97

Zoological Notes 107

Society News 116

Requests for Information 120

Published by The Renfrewshire Natural History Society
Department of Biology, Paisley College of Technology, Paisley

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The Western Naturalist

Volume Three 1974

Annual Subscription £2.00

A Journal of Scottish Natural History